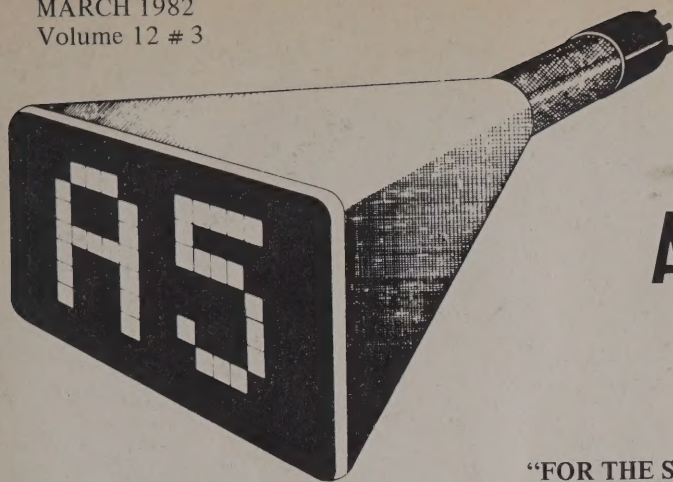


MARCH 1982
Volume 12 # 3



Our 15th Year

\$2.00

PUBLISHED MONTHLY

AMATEUR TELEVISION MAGAZINE

"FOR THE SPECIALIZED COMMUNICATION RADIO AMATEUR"
FCC approves SSTV-FAX in general HF bands February 22, 1982.



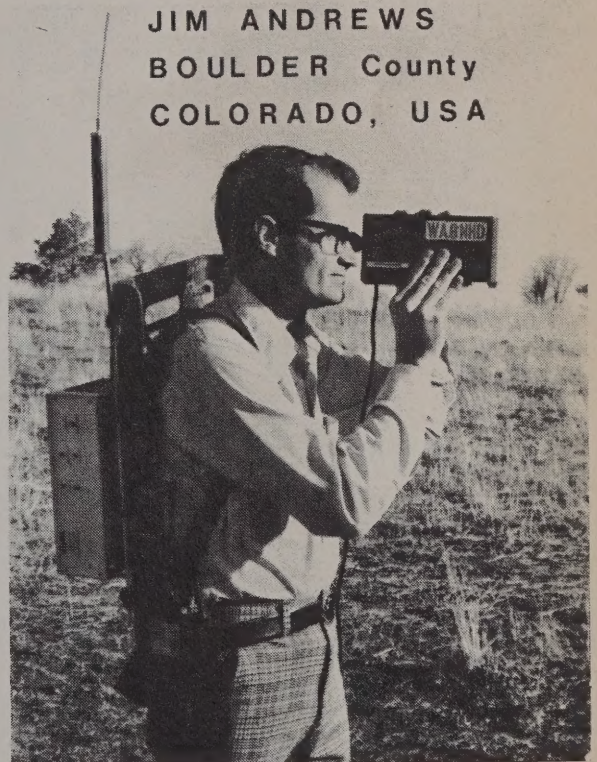
SPRINGFIELD, ILLINOIS FSTV RECEIVED BY WBØ ZJP, ST. LOUIS,
MO. 110 MILES

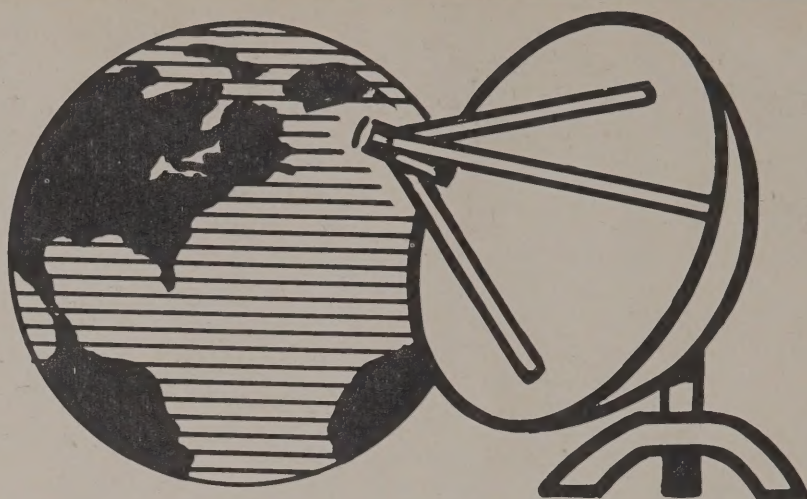


JIM ANDREWS
BOULDER County
COLORADO, USA

A5 ATV MAGAZINE EXPANDS TO MONTHLY ISSUES!

- 40 Meter FSTV HF Net Resumes
- Dayton ATV Activities Announced
- Grounded Grid Linear for FSTV
- Care of Transistorized ATV Linears
- Silvermail SE1a ATV Transceiver Review
- NEW ATV Book Soon Released!
- Build Your Own TVRO Part 1 of 7
- FCC Adopts SSTV/FAX for Generals
- KW/Wraase SC-422A Review!
- Robot 400 Graphic Overlay Mod KB9MC
- K6AEP/TRS80C Computer Part 2
- RTTY with Joe Elliott KØWVN
- And Much More!





SATELLITE TELEVISION SYSTEMS

WE WILL NOT BE UNDERSOLD!!

**Complete Systems, Antennas,
Receivers, LNA's & Accessories**

CALL US TODAY!

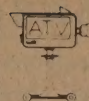
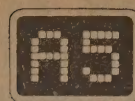
812-238-1456

**hoosier
electronics**

"Nation's Largest Total Communications Distributor"

P.O. BOX 3300 • TERRE HAUTE, INDIANA 47803

Commentary



Publisher: Amateur Television Magazine

AMATEUR TELEVISION received a big "boost" in the FCC's adoption of Henry B. Ruh's RM2861 proposal for the expansion of SSTV operating privileges into the General phone bands of 15, 20, 40 and 80 Meters. Henry's proposal, done at the time he owned and published A5 ATV Magazine, was announced in a Notice of Proposed Rulemaking by the FCC in June 1980 with comments due by September 1980. A5 ATV Magazine, representing the interests of Amateur Television operators, ran a poll of its' readers as to what frequencies should best be utilized on the HF bands and to seek support in a letter writing campaign to the FCC in favor of RM2861. The results were a bit disappointing in that here is the opportunity to get some extra needed privileges and room for SSTV transmissions for Generals with only a few a very few responding to the FCC requests. Did you respond in writing? Nevertheless, a long winter prevailed in 1980 and almost an entire fall and winter passed again in 1981 until surprisingly, on November 24th, the FCC announced formal adoption of now Docket 80-252 with a later announced operation starting date. We all owe Henry B. Ruh, KB9FO (and Robert Rochrig for FAX RM-3239) letters of thanks for their accomplishments. Henry's address is 7391 W. Hwy 46, Ellettsville, Indiana 47429. At my request, Brooks Kendall W1JKF mentioned this announcement on the 20 Meter SSTV Net on Saturdays and discuss with the Net as to suggested frequencies that Advance Class SSTV operators would like to see in the General Bands to obtain a working relationship in the TV mode by all enthusiasts. The results were interesting to say the least and many varied ideas were injected. Many of the ideas, understandably had little chance for forthought and comments such as "I am unfamiliar with that part of the band and just what goes on there," were common. It is the General operator who best knows the band and what DX, Nets, Ragchew and Phone Patching areas exist. Results of a long study by A5 ATV Magazine are published herein with recommended calling and operating A5 SSTV frequencies on all bands. I suggest all SSTV'ers read this study carefully and pass the contents on to others during your SSTV transmissions. It is vitally important for the hard times that lie ahead of obtaining a respected area of SSTV operation that an intelligent choice of frequencies be utilized and not merely because the SWR is lower on another part of the band. Again, my hat is off to Henry Ruh and Robert Rochrig. Thanks fellas! "Can you handle another piece of good news all in one issue?" A5 ATV Magazine is going to 12 issues per year starting with this issue!!!!!! I am now devoting "full-time" to ATV Magazine and after 15 years of publication at bi-monthly 6 times per year issuance, ATV Magazine will be a monthly journal! We have received a vast amount of favorable mail with the new format and with the future anticipated growth in the ATV ranks looking very promising, the move was decided in December to go to the expanded coverage. I need your help in getting out the word about ATV Magazine. You would be surprised the number of stations on the air who don't know about us. Nearly everyday I hear newcomers getting on ATV and just "looking" for information. It isn't QST, 73, Ham Radio or CQ Magazine that has printed over 700 articles on ATV operation for the last 15 years. Please pass the word about what we are doing here, thanks! Here is how the subscriptions will be handled with the more frequent issues; Check the subscription label date code on the back of the magazine. We have went thru all subs & changed the old dates to the new expiration dates. For example, let's say a subscriber's expiration date was NOV82. The subscriber paid for 6 issues (in Nov. 81) and the six issues would be JAN-FEB (combined), MAR-APR-MAY-JUNE and JULY 82. The renewal card will be mailed in June (with a final reminder card in July). Inotherwords, count the number of issues you signed up for and then count the number of months from your starting date and the date should match on your present label. If it doesn't or you have any questions, feel free to drop me a line and I will give you a quick reply as always. The number of average pages per monthly issue will be planned at 40 (printer requirement to stay in multiples of 8). Even with my well accepted expansion to 48 pages (at the bi-monthly printing), a 40 page issue times 12 issues gives a total of 480 pages per year versus 288. And, we will now be more frequent in publication (no more long waits) and even more timely with material. Our advertising will improve with the more frequent publishment. Also, I have notified all advertisers and authors that we are working on a "new" timetable with each issue allowing a prompter arrival date to you the subscriber. Most of you on the East and West Coast saw A5 ATV Magazine arriving in the mail to you around the 3rd week (or later) of the intended month (largely due to slow mail service). When did you get the issue this time? We are now mailing 3 weeks ahead of the intended month instead of the past one week insertion. Let me know if you see a faster "on time" delivery schedule. For you foreigners, a reminder that all subscriptions are mailed SURFACE unless AIR-MAIL or FIRST CLASS postage is included in your subscription rates. Thanks for your support and see you at Dayton 1982! DE WB0QCD

THE DENSON ELECTRONICS CORP.

OFFICE: Longview St. MAIL: Post Office Box 85

Tel. Area Code 203/875-5198

ROCKVILLE, CONN. 06066 USA

- 2 to 1 Interlace
- Lightweight, weighs only 29 ounces
- Compact, miniaturized
- Operates from standard AC outlet
- Operates from DC (Battery, Car, Van, Boat)
- 10,000 to 1 Automatic light compensation
- External power module
- Dustproof, moisture resistant Case



Model CTC-2200

WOW

\$195.00

LESS LENS

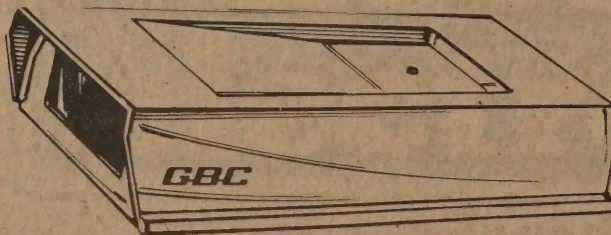
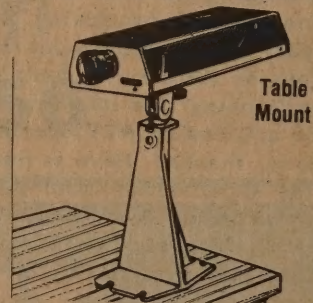
#10,100 - GBC Model CTC-2200 Mini-Max VI 2 to 1 interlace camera. Lightweight, compact operates from standard AC outlet or DC (battery, car, van, boat). 10,000 to 1 ALC. Dustproof, moisture resistant case. 550 lines resolution; Video Bandwidth 7 MHZ; Video Output 1.0V pp composite. 8 5/8"L 4 4/8"W 2"H, wt. under 2 lbs. \$195.00 (less lens).

Camera may be mounted from either top or bottom with 1/4/20 thread screw. Standard C mount for lens.

#10,102 - 16mm F1.6 lens, adjustable focus - no iris. When purchased with above camera only \$24.95

#10,103 - Model LWA-2007 Wide angle lens converter screws into front of above lens converting it to a 8mm F1.6 wide angle lens. Sold only with above lens because that is the only lens it will fit. Only \$37.95

#10,101 - WM-36 Wall Mount "three in one" (wall, table or ceiling mount.) Sturdy weatherproof durable camera mount for indoor/outdoor use. Adj. panning head gives camera 360° horiz. & 90° vert. mobility. Can be secured to mounting surface in minutes. Camera easily attaches to locking disk on pan head. 8" long including pan head 1 1/4" wide at pan head base 3 1/2" wide at mounting base. Wt. 10 1/2 oz. Holds up to 5 lbs. \$19.75



#10,104 - LOH-2005 Indoor-Outdoor Camera Housing. Constructed of rugged weather resistant ABS cyclac material. Housing base is made of lightweight corrosion resistant material. Lens window is scratch resistant glass. Hardware is cadmium plated to resist rust. Tested to withstand temperatures from -30°F to +150°F. Designed to allow for top or bottom mounting. 5 3/4"W 15 3/8"L 3"H, Wt. 1 lb. 4 oz. \$45.00



Letters to the Editor



"Thanks for taking over the task of keeping A5 alive and you are doing well. Keep up the fine job and really like your new format. Enclosed is my check to continue my subscription. I am heading down to WA7WOD QTH in Texas this weekend. I told him to take his wife's hand mirror and line the reflected image with the normal one and view it in 3D stereo! I can see it all now-3D Stereo SSTV with 6 memories!" -LeoTevlin WØTV Normandy, Mo. Editor-Thanks for the "flowers" Leo, it keeps the fires going up here in Cold Iowa... as for the Stereo SSTV Don Miller beat you out quite a few years ago! Thanks and enjoy each issue. -QCD

"The last issue (September) was GREAT! What an outstanding issue. They keep getting better and better. I am looking forward to the Oscar articles on SSTV that will be taking place and am also glad to see that you are incorporating a bit of RTTY in the magazine. Enclosed is an ad for the "free" subscriber classified-ad section." -Mark A. Schiebl WB5HVB, Houston, TX.

"Can anyone help me find an electrical viewfinder for my RCA CC001 Color Camera? Does RCA make one that fits my camera or is there one that may be adapted?" -Richard Frombach AB2X 202 Beechwood Court, Mt. Laurel, NJ. 08054

"About the SSTV frequencies, I think 14.230 Mhz. is a disaster area! However, if we changed the frequency it wouldn't help. The band is so cluttered with garbage it doesn't really matter. The 15 Meter frequency suggestion sounds okay. I would like to see 29.180 Mhz. used for 10 Meter operation as it is almost always clear. Maybe we should allot a special frequency for Sam to sell his Color system? I am getting sick and tired of hearing him on 24 hours per day, pushing Color SSTV. I think he is driving hams off the air who have only the P7 or BW Robot systems alone. They feel badgered and I'm sure reluctant to even get on anymore." -Name withheld at request.

"The word is out in Southern California that A5 Magazine is moving away from FSTV. As you know, A5 Magazine is the only national and international publication source for ATV and if a West Coast FSTV Column would be helpful, just let me know. I could supply circuits and pictures of what is taking place out here. I am also looking forward to a new updated ATV manual like ATV IN A NUTSHELL. There is a real need for it. Please include Videotape equipment in it also. Keep up the good work." -WA6SVT Mike Collis, Cosa Mesa, California Editor-If 28 pages out of 48 in the September issue, 20 pages out of 48 in the November SSTV Special issue, 24 pages out of 48 in the January issue is "moving away" from FSTV, then I think we are heading in the right direction. (How soon we forget past 25 average page issues). I'll take you up on your writing ability Mike as Tom O'hara W6ORG has been the only West Coast authority to support A5 ATV Magazine on a regular basis. West Coast send articles and pictures!

"We are interested in your Magazine and would like to ask you regarding the subscription, we await your reply..." Ihsan Jaafari, Managing Director of Ihsan Workshop, Iran.

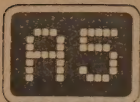
"Thanks for the subscription card, here is one years fee" -Abdullatief K., YCØBXP, S. Arabia

"We want a full blown article on Joe Casey's 13 foot homebrew Earth Station Dish Antenna that was featured in the November/December 1981 issue" -Many readers responding to A5 Mag.

"We are doing a study of SSTV for the Corporation and would greatly appreciate any literature on the SSTV mode possible. Please send a list of back articles" HL Ifland, EXXON CORP. NY.

"I am very excited over your new editorial policy to deversify within the various modes of Amateur Specialized Communications. Have a Happy New year!" -Alan Smith W8CHK

"Enclosed is an article for ATV Magazine on my New Colorscan SSTV Conversion Kit for Robot 400 owners. It will also be on display again this year at Dayton." Syd Horne VE3EGO (April issue)



World News Roundup

The FCC surprisingly announced formal adoption of Henry B. Ruh's RM-2861 proposal to allow SSTV operation in the General portions of the Amateur HF Bands as well as Robert Rochrig's RM-3239 proposal for FAX operation in the same area. The adoption was announced Nov. 24th with an operation starting date yet to be announced. See details of Docket 80-252 inside.

W0TV Leo Tevlin reported a nice contact with VU2DK in India on SSTV July 11th, 1981. The VU2 SSTV station was one-way receive only and needs parts for his camera to get on two-way SSTV. Write the VU2 station for assistance at Zal R. Kabraj, 55 Anand Park, Aundh, Poona 411007 IN

WB7AJC/MM recently reported ATV contact of 475 miles with WB6JCG in San Diego was also verified in Color by Mike WA6SVT in Costa Mesa (80 miles up the coast) on videotape and was also verified by WA6ZMI in Westminster, CA. WB7AJC was using 7 watts into a homebrew broomstick antenna on the superstructure of a US Navy Ship. Congratulations WB7AJC/WB6JCG

RTTY DXpedition to VP2E - Anguilla, FS7 - Fr. St. Martin and PJ7 - Neth. St. Maarten will be conducted between February 22nd and March 5th, 1982 with most of the operation on Anguilla & several days on St. Martin. Operators are Everett Jackson WA8CZS, Jeff Maass K8ND/VP2EV and others. HAL equipment will be used. Schedule information WA8CZS (1-614-452-7971).

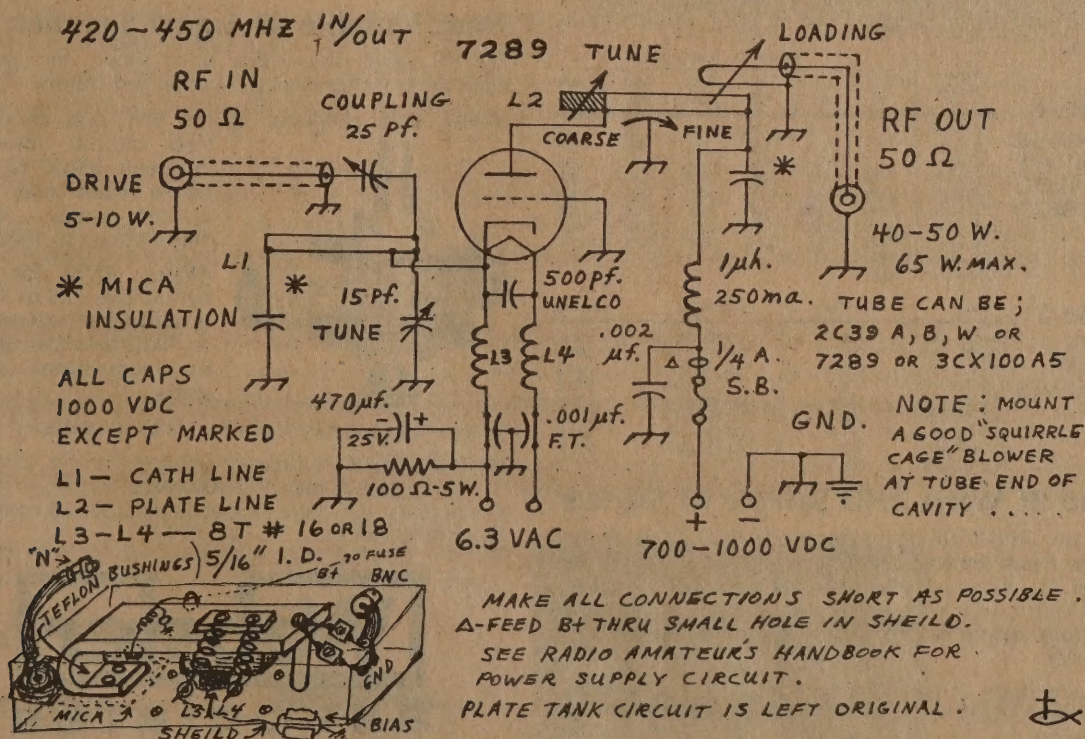
The Southern California Repeater and Remote Base Association (SCRRBA) announced adoption of a revised 23 cm. band plan concluding with a meeting of many groups representing all modes and frequency users. The meeting emphasized expansion in the ATV and Satellite fields. For a complete report, write SCRRBA at PO Box 5967, Pasadena, California. Tnx SCAL Newsltr.

W9NTP Don Miller reports that everything is shaping up for the big Dayton Hamfest with a very strong program lined up for ATV. Holiday Inn North, Pine Room on Friday night will be the place for ATV'ers to gather starting at 7:30 pm. with Robert Suding heading the discussion of the FSTV and SSTV modes which includes the displaying of equipment and videotape presentations. All ATV'ers are asked to bring their "projects" that they have been working on the past year. The Saturday afternoon lineup includes the 2 pm. ATV FORUM featuring Mike Stone WB0QCD with a talk on FSTV which includes his own produced directed videotape film, Jim Buttleman WB0KFB additionally will demonstrate portable FSTV, Jeremy Royle G3NOX will cover Color SSTV at 2:45 pm. with a special guest George Steber WB9LVI at 3:15 pm. The program should conclude around 4 pm. with Don Miller W9NTP as moderator of the entire affair. See you there?

The "renewed" 40 Meter ATV Net (FSTV) conducted by Chicago area ATV'er Ron Stephanskis, W9ZIH of Hickory Hills, Illinois got underway again for 1982 on Saturday, January 16th at 11 am. (1700 GMT) on 7.290 Mhz. The Net had previously met for some time on 7.160 Mhz. until cold weather settled in and the UHF bands diminished for ATV-DX'ing. Topics of regular discussion will cover FSTV equipment, Linears for FSTV, low-loss cable feed systems, preamplifiers & Antenna/Propagation. FSTV signals have been "seen" and heard as far away as New York and Pennsylvania from Chicago and many Iowa/Illinois "new" stations will be seen this summer on "openings"! 7.290 Mhz. was chosen as the best MUF for midwestern stations for UHF schedule transmissions and also to aid in the establishment of ATV on the new 40 Meter authorized SSTV calling and operating frequency within the General Class Amateur Bands. Comments or more information can be obtained from W9ZIH at 8950 S. Maple Lane, Hickory Hills, Ill. 60457

For many years, ATV IN A NUTSHELL by Henry B. Ruh, was the "bible" for ATV operation. Calls for the 70 page publication still arrive almost daily. A "New" publication of nearly 100 pages on ATV operation called; "EVERYTHING YOU WANTED TO KNOW ABOUT ATV but were afraid to ask" is underway utilizing alot of the material in the original ATV IN A NUTSHELL and additional updated material supplied by known ATV authors. The book will be published by HALL DIRECTORIES in Topeka, Kansas and should be available by Dayton 1982 at the A5 booth.

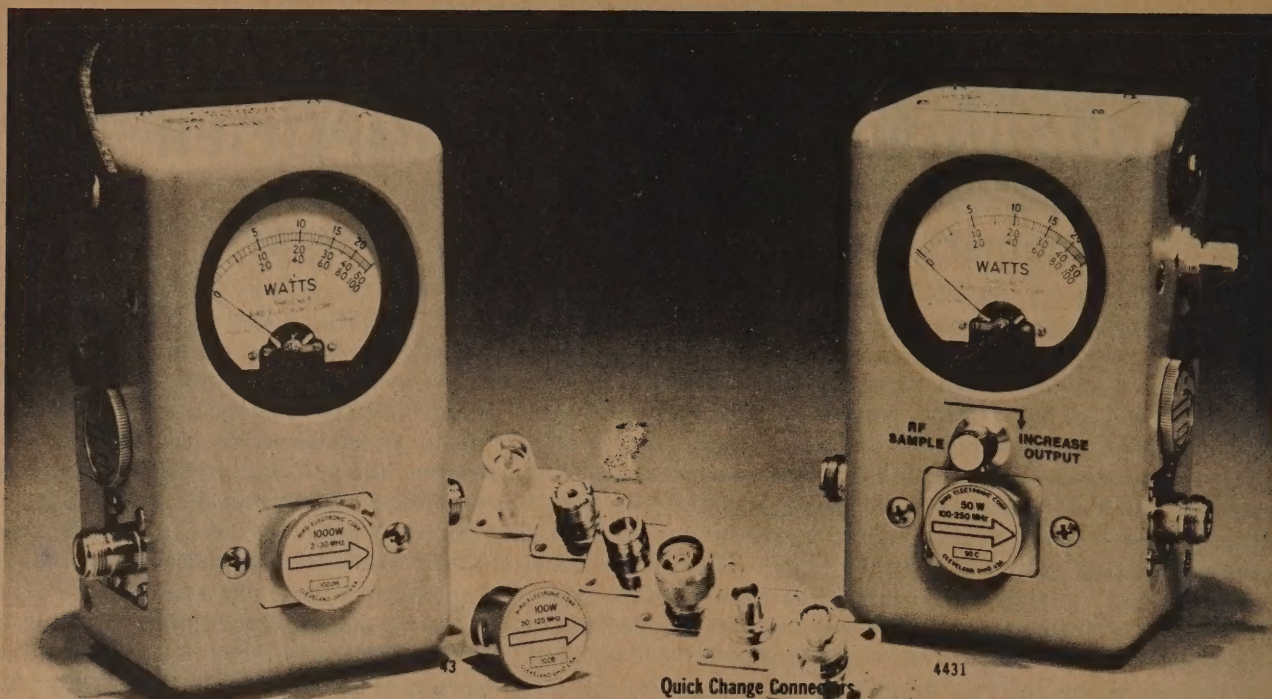
A modified Motorola T-44 UHF cavity final section (or GE Progress line for UHF) can be utilized for a Grounded-Grid Linear Amplifier for ATV Color Video and Sound as well as Black and White video. The ARRL "Radio Amateur's Handbook" can be referred to for the homebrew power supply circuit that can be built to power the linear. The amplifier is good for 420-450 Mhz. which could be utilized for other modes. Some simple guidelines should be noted: 1. Remove final section from original chassis and mount on the new chassis. The cathode circuit should be in a well shielded enclosure. 2. Remove, (one by one), 4 screws holding the grid plate and then remove the teflon bushings, replacing each screw and saving the teflon bushings as they will be needed later. 3. Remove the cathode line and enlarge the 2 holes in the curved end in order to fit the teflon bushings. 4. Take a mica insulator (used for mounting power transistors) and fit it under the end of the cathode line and secure. Check with ohmmeter to verify no short between the cathode line and ground. 5. Mount remaining parts as shown. 6. The built up or used power supply should be well filtered and regulated. 7. Turn on the blower and filament supply - wait a minimum of 60 seconds. 8. Terminate amplifier into a 50 ohm 50 watt load with no drive. 9. Apply B plus and verify the idle current of approximate 30-60 ma. 10. Apply drive and adjust amp for maximum output, cathode current approximate 100-125 ma. 11. Now go back and increase input coupling for a slight decrease in power. Adjust the input tune on the high frequency side for a slight decrease in power. 12. Now increase the plate loading for a small decrease in power. Tune the plate tank on the upper sideband for a small decrease in power. 13. Check with a scope the amplifier outputted video and look at the quality of color picture and sound outputs. 14. Measure the power with sync and black level modulation, this gives average video power, for a peak power reading multiply by 1.68. 15. CAUTION Never apply B plus with top cover removed! Happy Video! D. W. Moon, K6KMN (June 81) (Article taken from Southern California ATV Club Newsletter)



MODIFIED MOTOROLA T-44
UHF CAVITY FINAL SECTION.
DRIVER CAN BE USED - ALSO,
GE. PROG-LINE CAN BE USED.

GROUNDING GRID LINEAR
AMPLIFIER FOR ATV
COLOR VIDEO AND SOUND

By, D.W. MOON
K6KMN June 81



The indispensable BIRD model 43 THRULINE® Wattmeter

Read RF Watts Directly.

0.45-2300 MHz, 1-10,000 watts $\pm 5\%$, Low Insertion VSWR—1.05.

Unequalled economy and flexibility: Buy only the element(s) covering your present frequency and power needs, add extra ranges later if your requirements expand.

Table 1

**STANDARD
ELEMENTS
(CATALOG
NUMBERS)**

Power Range	Frequency Bands (MHz)					
	2-30	25-60	50-125	100-250	200-500	400-1000
5 watts	—	5A	5B	5C	5D	5E
10 watts	—	10A	10B	10C	10D	10E
25 watts	—	25A	25B	25C	25D	25E
50 watts	50H	50A	50B	50C	50D	50E
100 watts	100H	100A	100B	100C	100D	100E
250 watts	250H	250A	250B	250C	250D	250E
500 watts	500H	500A	500B	500C	500D	500E
1000 watts	1000H	1000A	1000B	1000C	1000D	1000E
2500 watts	2500H					
5000 watts	5000H					

Table 2

**LOW-
POWER
ELEMENTS**

1 watt	Cat. No.	2.5 watts	Cat. No.
60-80 MHz	060-1	60-80 MHz	060-2
80-95 MHz	080-1	80-95 MHz	080-2
95-125 MHz	095-1	95-150 MHz	095-2
110-160 MHz	110-1	150-250 MHz	150-2
150-250 MHz	150-1	200-300 MHz	200-2
200-300 MHz	200-1	250-450 MHz	250-2
275-450 MHz	275-1	400-850 MHz	400-2
425-850 MHz	425-1	800-950 MHz	800-2
800-950 MHz	800-1		

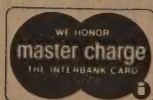
Read RF Watts AND Sample RF Signals

The new THRULINE Wattmeter model 4431 offers all the power measurement functions and versatility of the model 43 (above). It also provides a variable RF signal sample for use with frequency counters, scopes, spectrum analyzers, etc. at the same time power tests are made.

The amplitude of the RF sample is adjustable between -15dB and -70dB by a control knob on the front of the wattmeter.

115 Bellarmine

Rochester, Michigan 48063



We accept
Master Charge
&
Visa



Quick Change Connectors

Read RF Watts AND Sample RF Signals (cont)

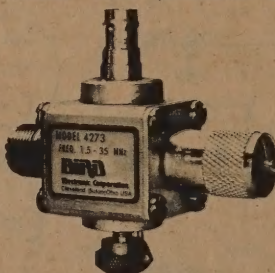
Max. Power Rating is 5000 watts (2-30 MHz) and 1000 watts (30-1000MHz). VSWR with RF samples -30dB or lower is 1.07. Model 4431 uses Table 1 and 2 Plug-in Elements.

QC-Quick Change Connectors avoid the use of performance degrading adaptors. Order spare QC Connectors for model 43, or 4431. These models are shipped with the N-Connector shown, unless ordered otherwise.

New: Variable RF Signal Sampler

For RF signal observation on a scope, for spectrum analysis, or for frequency counting and control.

Model 4275 produces at the BNC port an unrectified sample adjustable between 35dB to 80dB below main line signal. Usable range: 20 to 1000MHz up to 1000 watts.



Model 4273 for lower frequencies (1.5 to 35MHz) is adjustable between 40dB to 70dB below a main line maximum signal of 5000 watts.

Level settings can be locked on both samplers.

Insertion VSWR—1.1 max. 2-512MHz

1.25 max. 512-1000MHz

Connectors—QC-Type as specified (choice of connectors determines price).

Webster
associates

CALL TOLL FREE

800-521-2333
IN MICHIGAN 313-375-0420

CARE AND FEEDING OF TRANSISTORIZED ATV LINEAR AMPLIFIERS MICROWAVE MODULAR MML437-50 AND MIRAGE D1010 BY W6ORG

All high-power transistor amplifiers suffer from gain compression in the last 3 db of their available power. For example, a 50 watt rated amplifier requires a 6 or more db drive change to increase the power in the last 3 db from 25 watts to 50 watts output. While this is okay for SSB, FM or CW, it kills the sync amplitude with ATV. The result is tearing, jitter or at the worst an uncontrollably rolling picture. The cure is to run the transistor amps at 1/2 power rating, or predistort the sync pulse to compensate. The MML432-50 can then be run at 28 watts pep output, or at 40 watts pep * with the addition of the sync stretcher parts on the TXA5-4 exciter-modulator. PC Electronics can set up a basic module package or TC-1 Transmitter/converter for sync stretching and proper drive as an option at the time of purchase for the MML432-50. The SS-1 sync stretcher board is also available for use with other low power modulators such as the VM-3. PEP, or peak envelope power, is the instantaneous maximum power during the greatest part of the modulation. In the case of ATV this is during the "sync tip". Since the sync tip is clamped to the same power output point as adjusted by the modulator bias pot, you can set the amplifiers pep easily. SET UP STEPS are given below: (*60 watts pep/90 watts pep with SS-1 for Mirage.)

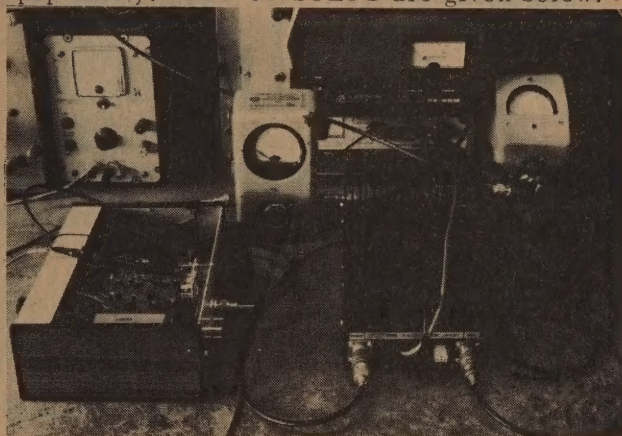
1. Add the sync stretcher parts or circuitry to the video modulator. 2. Connect the amp to the 10 watt TV transmitter, put a good inline wattmeter on the amp output, and connect amp to a good regulated 13.8 vdc 10 amp power supply. If you do not have a good supply, we recommend the Astron RS-20M. If you do not have a wattmeter made for 420-450 Mhz, you can get close by monitoring the 13.8 vdc draw. The RF output must be connected to a good dumload or low vswr antenna. 3. Remove any video input connection. (just turning down the video gain won't do it as the sync stretcher circuit still outputs sync.
4. With the power switch turned off, set the exciter bias pot (full clockwise) and back off about 10 degrees.
5. Turn on the amp and then the 10 watt transmitter. Slowly turn up the bias pot until the output pwr meter just reaches 40 watts (90 watts on Mirage D1010) about 8 amps on the 13.8 vdc supply (16 amps on the Mirage D1010). The drive at 40 (90) watts will be around 5 watts (4 watts). Do not be tempted to go higher as the sync will be cut down too far. You will not see any difference between an extra 10 watts. 6. Reconnect the video input and slowly increase the video gain for best picture. The average will indicate between 23 and 35 watts or 5-7 amps (50-80 watts at 11-15 amps) depending upon the camera and the subject picture used. The sync tip (pep) output will still be 40 watts (90 watts) thanks to the modulator diode clamp.

When using either the Microwave Module MML432-50, Mirage D1010 or any linear amplifier for ATV, the antenna must have a low vswr at the higher power levels or some of the reflected RF may get back into the camera or video modulator and cause instability. We suggest using good type N UG-21 connectors on Belden 8214 or RG 213 type coax and UG-349 N to BNC adapters. The heavy leads to the power supply should not be smaller than #12 wire and no longer than 3 feet in length. (In fact, the shorter the run-the better the video stability.) On the MML432-50 amp pin 3 is ground and pin 5 is the plus 13.8 vdc regulated. Set the amplifier where there is enough free air circulation or add a small fan to blow air over the heatsink frame.

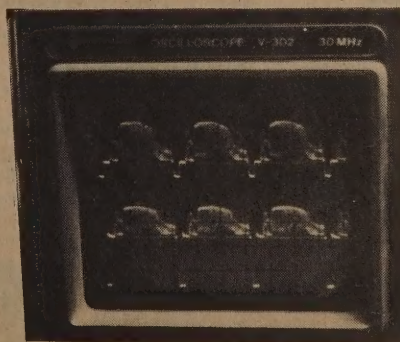
DE Tom O' Hara W6ORG

TC-1

FAST
SCAN



Test Setup for Sync Adjustment



Top trace is 90W
D1010 Amp output

Lower trace is
TC-1 sync stretch
output to the amp.

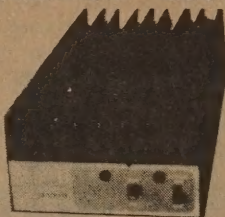
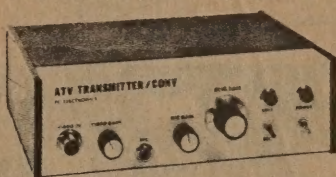
DM-1 circuit used
to monitor output.

P.C. ELECTRONICS 2522 Paxson Lane,
Tom W6ORG Maryann WB6YSS Arcadia, California 91006

WHY GET ON FAST SCAN ATV ?

- You can send broadcast quality video of home movies, video tapes, computer games, the shack, etc., at a cost that is less than slowscan. Requires only a technician class or higher.
- Really aids public service communications for parades, RACES, CAP searches, weather watch, marathons, etc.
- DX is about the same as 2 meter simplex - 15 to 100 miles.
- ATV uses broadcast standards. No special converters needed. Receive full color and sound on a regular TV set.

TC-1 TRANSMITTER/CONVERTER ALL IN ONE BOX READY TO OPERATE \$ 399 delivered U.S.



Plug in camera, antenna, mic, and TV set and you are on the air. Contains the 4 basic modules, AC supply, and T/R switch. Full color and sound. Specify xmtr freq and TV ch 2, 3, or 4.

MIRAGE D1010-N modified for ATV . . \$ 299 delivered U.S. Runs 90 watts p.e.p. on atv. Requires sync stretcher in exciter. Add \$ 50 if you would like us to match the TC-1 to the D1010-N.

Build Your Own System with The Basic Four Modules



1. TXA5-4 ATV EXCITER/MODULATOR \$ 89 ppd

This wired and tested module is designed to drive the Motorola MHW-710 module in the PA5 10 watt linear amp. The crystal in the 100 mHz region keeps harmonics out of two meters for talk back. The video modulator is full 8 mHz for computer graphics and color. Requires 13.8 vdc reg @ 70 ma. Tuned with xtal on 439.25, 434.0, or 426.25 mHz. Two Freq \$ 115 ppd.



2. PA5 10 WATT ATV POWER MODULE \$ 89 ppd

The PA5 will put out 10 watts RMS power on the sync tips when driven with 80 mw by the TXA5 exciter. 50 ohms in and out, plus bandwidth for the whole band with good linearity for color and sound. Requires 13.8 vdc regulated @ 3 amps.



3. FMA5 AUDIO SUBCARRIER GENERATOR \$ 29 ppd

Puts audio on with your camera video just as broadcast TV does at 4.5 mHz. Puts out up to 1 v p-p to drive the TXA5 or VM-2, 3, or 4 modulators. Requires low Z mic (150 to 600 ohms), and +12 to 18 vdc @ 25 ma. Works with any xmtr with 5 mHz video bandwidth.



4. TVC-2 ATV DOWNCONVERTER \$ 55 ppd

Very sensitive stripline MRF901 (1.7 db NF) preamp and double balanced mixer module digs out the weak ones but resists intermods and overload. Connects between uhf antenna and TV set tuned to channel 2 or 3. Tunes 420 to 450 mHz. Requires +12 to 18 vdc @ 20 ma. Super sensitive TVC-2L with NE64535 preamp (.9 db NF) stage \$ 69 ppd.



TVC-4 ATV DOWNCONVERTER \$ 89 ppd

This is a packaged version of the TVC-2 converter with internal power supply. Has BNC input and F output connectors. Also available with the NE64535 for \$ 105 ppd. (TVC-4L) Size 5 1/4 x 2 1/2 x 7 inches.

PACKAGE SPECIALS

TXA5-4, PA5, FMA5, and TVC-2

BASIC MODULE PACKAGE . . . \$ 249 ppd

OPTIONS:

2 frequency exciter add \$ 26

NE64535 low noise downconverter . add \$ 15

Packaged TVC-4 downconverter . . . add \$ 34

Magnacraft W120X-14 coax relay . . . add \$ 41

SEND SELF ADDRESSED STAMPED ENVELOPE FOR COMPLETE CATALOG AND ATV INFO. We have all your ATV needs: Antennas, Cameras, Repeaters, Video Monitors, Preamp, Linears, Test Equipment, and more. 19 years in ATV. Check, Money Order or Credit Card by mail. Credit Card orders call (213) 447-4565 1-82



Maryann
WB6YSS

P.C. ELECTRONICS

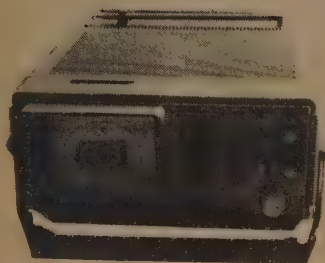
2522 PAXSON
ARCADIA, CA 91006

Tom
W6ORG



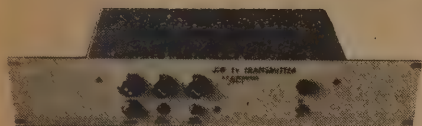
P.C. ELECTRONICS

SEE US AT DAYTON BOOTH 71



5" COLOR AC/DC PORTABLE TV/MONITOR\$299ppd

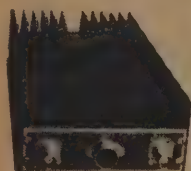
Liberty model 5010 has video and audio inputs and outputs Use as a color video monitor, standard TV, VCR tuner, or repeater receiver. Operates on 117vac, external 12vdc, or internal D cell batteries (not supplied). 12 x 12 x 6"



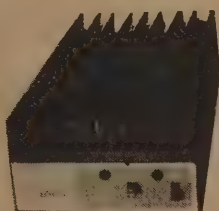
TVX-1 TELEVISION TRANSMITTER\$500ppd

This is a complete 10 watt UHF TV transmitter in a 3½" high 19" rack panel intended for community television outside the USA. Available on *TV channels 14 thru 20 or on ham ATV frequencies. Takes baseband video and line level audio input from a TVRO, VCR or camera. Also a mic input for voice overs. 117vac 60 hz supply. Monitor output. 4 to 6 week delivery depending on frequency.

*Only ham freq. available for use in USA.



MML432-50



D1010

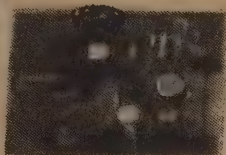
D1010-N MIRAGE ALL MODE 100 WATT AMPLIFIER....\$299ppd

420 to 450 mHz, FM, SSB, CW, and ATV. Up to 90 watts pep on ATV with only 4 watts drive. Req. 13.8 vdc reg. at 20 amps. Uses "N" connectors. 12" x 3" x 5½". Specially modified by us for ATV.

MML432-50 MICROMODULES 50 WATT AMPLIFIER...\$269.95

+ UPS

All modes, builtin low noise preamp, 5 in/40 pep out on ATV. Req. 13.8 vdc reg. at 8 amps. BNC connectors. 11" x 5" x 2.2". Charge card or COD only on this unit. Requires sync stretcher added to TXA5 Exciter.



DM-1

DM-1 RF/VIDEO DETECTOR & MONITOR.....\$20ppd.

Samples RF off xmtr coax and outputs 1 v p-p video to monitor your own camera and setup. Also outputs to a external 50 uA meter for relative power. Req. +12 to 18 vdc at 25 ma. PC board only\$ 5ppd.



TVG-1



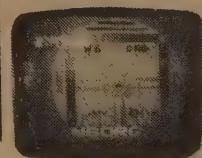
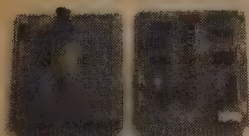
TVG-12

TVG-1 and TVG-12 ATV TEST GENERATORS\$15ppd ea.

Connect your camera and you have about one milliwatt on the air for demos, ant tests, or receiver alignment. Req. 9vdc at 7 ma. TVG-1 tunes 400-480 mHz and TVG-12 tunes 1200-1300 mHz.

TSQ-1 TV S-METER AND SQUELCH BOARD\$5ppd

Add common or Radio Shack parts, tap into TVs video IF AGC line, break one speaker lead, and you can better align the antenna, give relative signal reports, and have no noise between contacts.



VIDEO SPECIAL AFFECTS:

Family of plugin cards designed to superimpose characters, supply external sync, and other effects to be added later. Start your effects cardage now with the VDM-3 and VID-3. A must for repeaters!

VDM-3 VIDEO DISPLAY MIXER 2 camera switcher, superimpose mixer, V & H drive outputs, and raster gen.....\$69ppd

VID-3 VIDEO IDENTIFIER Superimposes call or any 6 letters in camera video. 1 programmed PROM included. Works with VDM board....\$69ppd

IDS-3 ID SEQUENCER steps thru up to 5 PROM ID memories to show call, city, CQ, repeater, etc\$49ppd. PROMS \$15 ea.

CBG-3 COLOR BAR & PATTERN GEN. Uses 16 pattern MM5322N chip. Camera & gen video switcher, xtal controlled, many features.....\$99ppd

AIM-3 AUDIO & ID MIXER. Mix & remotely switch or attenuate 4 audios & programmed MCW ID. Line & .4W speaker outputs\$69ppd.

NEW

CALL 8am-6pm M-F

TOM W6ORG P.C. ELECTRONICS • 2522 PAXSON LANE • ARCADIA, CA 91006

(213) 447-4565

1-82

AMATEUR TELEVISION MAGAZINE

Upcoming Articles in our April Issue! (Mailed March 10th) Chicago ATV Report, Portable Power Supply for FSTV Cameras, Strive to Rid Off those A5 Blues, Photography and ATV, Rose parade ATV, TRS80 Level 3 Mods for ATV, AQ4 Quaqi for Portable ATV, TVRO Part 2, VE3EGO Colorscan 403, Robot 400 Mods, Color SSTV Directory, Color SSTV Equipment System Comparisons, RCA Colortrack TV Modifications for Color SSTV, K6AEP/TRS80C meets the Epson Printer, Animated Motion SSTV, KØWVN and Radioteletype, A5 Classified Ads! (Send your photos and articles to A5 Magazine!)

ATTENTION CANADIAN SUBSCRIBERS: We apologize for another change in policy, but due to the expanded format of monthly issues and the new advanced mailing by 3 weeks-the previously mentioned First Class/Air-Mail rate charges have been dropped. All U.S./Canadian and Mexican subscribers are being mailed at bulk rates SURFACE. Your issues should now be arriving right on time and at less cost! Those of you who sent in the additional \$5.00 have been credited by 2 extra issues. Thanks!

NEW FSTV DX REPORT/SCHEDULE COLUMN NEXT ISSUE!

The 40 Meter ATV Net is again underway on 7.290 Mhz. (Saturdays 1700 GMT) and reports of ATV activity and DX schedules is requested! Send your schedule information, times of monitoring and success reports to A5 Magazine. Amateur Television DX Season is beginning for 1982! CU on A5!

COMPUTER SHOPPER

(305) 269-3211

P.O. BOX F, TITUSVILLE, FLORIDA 32780



SPECTRUM INTERNATIONAL, INC.

SEE US AT DAYTON!

"SPRINGTIME SPECIALS"

Microwave Modules MMC-421-426-439-ATV Receive Downconverters (Crystal Controlled for accuracy with Low-noise amplifiers) only \$69.95 (with guaranteed 2.0 db LNA add \$12.50, 1.25 db LNA add \$22.50).

PSF 1275-ATV Preselector Filter (Channel 7-8-9 output) only \$59.95

1296-LY (Loop Yagis) Antenna (with 18 db gain at full bandwidth and 7 foot boom) only \$64.70 (includes Type N connector for hookup)

MMK-1275-ATV Varactor Tripler (triples ATV, AM/FM to 1200 Mhz.) only \$109.95



J Beam MBM88/70cm

ONLY \$105.50

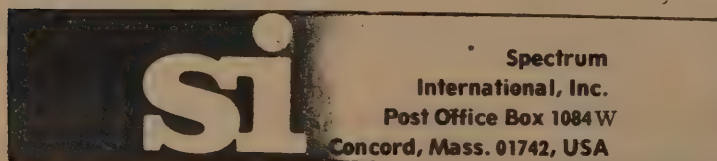
18.5 dbd gain

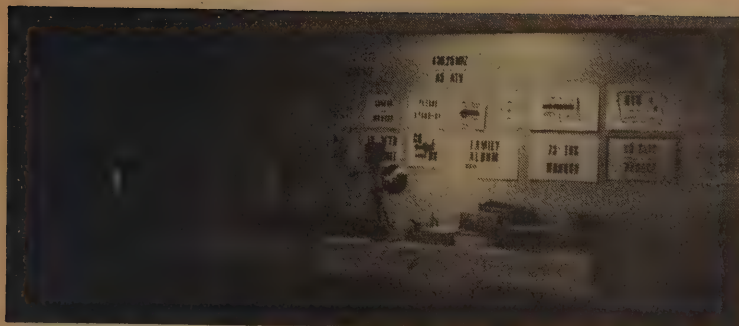
ATV
432 Mhz. SSB/EME



Jaybeam Limited

RUSH YOUR ORDER TO:





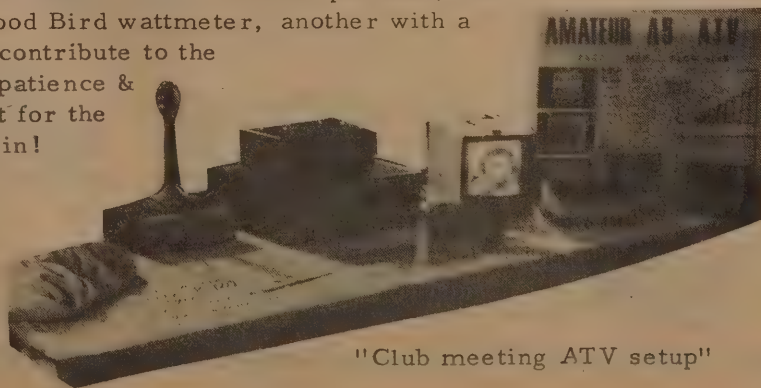
NO ATV IN YOUR AREA? THAT'S YOUR FAULT!

So what if you don't live in Southern California or New York City or Indianapolis, Indiana? It is up to you to get some FSTV activity going in your area-no one else will do it for you! The first thing you need to do is to select your victims carefully. That "good friend" 40 miles away might be a bit far for right now to get go-

ing on ATV. Look for Amateurs close around you like 5-25 miles. Find out who is on other specialized modes such as Moonbounce, Teletype or even Two-Meter SSB. Those with a genuine interest in VHF/UHF communications are the one's you need to target in on. You desperately need a "buddy" to get on-the-air with. If you can afford to, get him a downconverter and lend him a TV set if you have to (the best "hot receiving TV sets are on sale at Drug Stores and Discount houses for \$60-80 dollars). Once you get your "buddy" going and receiving pictures, you may have to swap rigs off and on for a while so you can "see" his transmissions. Videotape your on-the-air progress. It doesn't have to be professional quality, just turn on the videotape recorder and let it run while you are working ATV. You'll be surprised at the little helpful things that will come out in the program that will impress others. Use a very common Two-Meter FM frequency like the Club Repeater, etc. Talk on the FM system about adjusting the lights, more video, turn the beam, etc. The "interested bird-doggers" are listening. Be sure to vividly describe what you are seeing in the "other shack". Present programs at area Club meetings, set up display booths at local hamfests, get some newspaper or TV coverage if possible, always stressing the low cost and simplicity of getting on-the-air. Do not talk about things like hardline, connectors, multibeam antennas and power linear amplifiers at the beginning stages, as you will scare away those who are becoming interested (They'll find out soon enough about that later). Several ATV'ers have very good videotapes that can be copied and mailed to you. A program from Tom W6ORG or Mike WA6SVT or Bob K9KTH can be invaluable in getting FSTV up and going in your area. Find out who is currently on SSTV as they are the ones who already have cameras, lighting, etc. and are prime prospects for FSTV operation. Nothing can beat the actual "live" demonstration at a Club meeting or in shack visit. There is nothing more impressive than a timely key-up unexpected as your "visitor" is looking over your gear and sees an incoming video signal! ATV downconverters can be purchased in kit form for \$35-\$90 and always point out to prospects that the "receiver" is the TV set-an item which assuredly everyone has an extra one of. Stress the importance of a good antenna system and that other modes can be worked on the ATV antenna system such as EME, 432 Mhz, SSB and Satellites. Once you start getting stations on the air, it will begin to grow in popularity and the "word" will spread. Keep up the on-the-air publicity and successful accomplishments. A "borrowed" transceiver and a good small antenna like the 48 element J-Beam is great to have passed from one prospect to another. Before long, the evenings will be filled with TV signals and audio-subcarriers! In Iowa, there was virtually no ATV activity. Four Amateurs who were getting tired of Rtty and chewing the "rag" on two-meter FM decided to purchase gear at the Dayton 1980 Hamfest. Two years later (and alot of sweat) there are 16 stations on-the-air at 439 Mhz daily within a 50 mile radius of Iowa City, Iowa. The above procedures were followed with success. Now there is regular talk about subcarriers, preamps, linears, multi-antenna systems, hardline, video-switchers, lighting and other projects. It all started from one person who was interested and devoted enough to get everyone else going. Now, there is talk of forming ATV Clubs, having monthly meetings and performing public service work with FSTV such as parades, marathon runs and weather related coverage. Get someone with a good Bird wattmeter, another with a source for hardline, and others who can contribute to the ATV project you want to build up. Have patience & with a little bit of luck you'll have to fight for the frequency-just to get your video "break" in!

Let's see now...who shall be your first victim? Good luck!

Amateur Television



"Club meeting ATV setup"

ATV KITS AND MODULES



VM-2 VIDEO MODULATOR — Wideband collector video modulator for solid state exciters such as those from GLB and Hamtronics. Input for 4.5MHZ audio sub-carrier. 2 1/2" x 1 1/2"; **\$13.95 kit, \$18.95 assembled.**



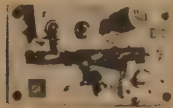
A-2 4.5MHZ AUDIO SUB-CARRIER — Accepts audio from VCR or GLB audio processor to provide ATV audio on TV set. Has on-board voltage regulator and shielded inductor. 2 3/4" x 1"; **\$18.95 kit, \$24.95 assembled.**



SA-1 VIDEO SYNC AMP — Provides separate video sync gain control for VM-2 above or SE-1a transceiver. Useful when driving solid state amps. 1 3/4" x 1 1/4"; **\$14.95 assembled, \$11.95 kit.**



TVM-1 TELEVISION MODULATOR — Adapts standard TV set so it will accept both video and audio. Uses LM1889 IC. 2 5/8" x 2 5/8"; **\$22.95 kit, \$32.95 assembled.**



P-1 WIDEBAND LOW NOISE UHF PREAMP — Uses MRF901 transistor to provide 16db gain and 1.7db noise figure. Covers 420—450MHZ band. Other frequencies received with change in input inductor. 2 1/4" x 1 3/8"; **\$17.95 kit, \$26.95 assembled.**



LA-1 UHF AMPLIFIER — Uses 15 watt MRF641 transistor with 7.8db gain @ 470MHZ. Stripline inductors with on-board pin diode antenna switching for a receiver. Designed for wideband color video with exciters such as the GLB T450L that provides up to 3 watts drive. Drilled and tapped heatsink included (4 1/2" x 1 3/4"). 1 to 3 watts drive typically gives 6 to 18 watts output. 12 — 14vdc operation @ 4 amps max. Double-sided board is 4 1/2" x 2". **\$69.95 assembled with test data.**

LA-45 UHF AMPLIFIER — Uses MRF646. Input power of 6-15 watts typ. gives 20-50 watts output. Biased for linear operation. Kit includes all parts, instructions and 4.2" x 3" double-sided stripline board. Needs 12-14 vdc @ 9 amps max. **\$59.95 kit.**

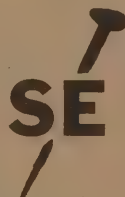


GLB T450L TRANSMITTER — 4 1/2" x 2" RF board typically supplies 2—3 watts FM output, 1 — 1 1/2 watts average video RF output. Changes for wideband video modulation provided. Comes with crystal for 439.25MHZ, with other frequencies available upon request. Also includes separate 1" x 4" audio processor board which supplies audio for FM modulation or for the A-2 4.5MHZ audio kit above. 12—14vdc @ 2 amps max. **\$54.95 kit, \$74.95 assembled and tuned.**

COMMON TO ALL KITS AND MODULES — 12 to 14 vdc operation. Drilled and plated glass circuit boards. Quality components with instructions including schematic and board layout.

AVAILABLE FROM:

Add 2% for shipping
Florida residents add 4% tax



Silvernail Electronics, Inc.
14061 - 111 Terrace North
Largo, Florida 33540

813/595-3317

(5—9:30 PM our time)

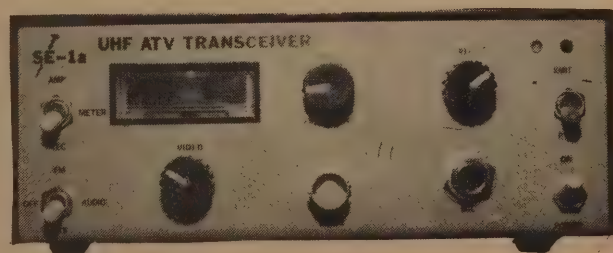


SE-1a

COMPACT, MOBILE OR FIXED ATV TRANSCEIVER

Being in the position that I am as publisher of A5 ATV Magazine, I run across and get to play with many of the different types of ATV gear in the marketplace and when I find one that deserves special recognition to our reader's-I like to print it. One such piece of ATV gear is Mike Silvernails SE1a FSTV transceiver. Recognizably more popular under a distributed SCIENCE WORKSHOP name, the SE1a transceiver transmits a video inputted picture at 439.25 Mhz. (other frequencies available) with 6-9 watts average output (mine is 8 watts on a Bird wattmeter) and has enough bandwidth for Color TV transmissions. Housed in a small handy case, the SE1a utilizes a GLB T450L modified transmitter exciter and stripline design linear amplifier that draws only 3.5 amp maximum. The DC-1 tuner for receive (reviewed in the January 82 issue of A5 Magazine) is a new designed downconverter system that features 2 stages of RF amplification using a low-noise MRF901 input stage transistor and tunes in excess of 420-450 Mhz. A very nice lighted reference meter on the front panel depicts relative receive position and signal output including amp draw via switch selection. The DC-1 downconverter has a "bonus" feature on reception in that no "extra" circuitry is needed to monitor the signal output as the same TV set can be used for monitoring output as well as receive signal display input. The use of a 2nd set across the shack can be eliminated. The DC-1 unit outputs RF into Channel 2, 3 or 4 selectable within the rig. Receive current draws only 150 ma. Another nice feature on the SE1a rig is a tunable picture "gain" control. Clockwise position gives the maximum allowable gain of the received signal and movement counterclockwise reduces signal strength gain-great for those close by stations or for weak signal testing purposes. On Carrier and Audio FM Subcarrier both are available on the SE1a unit at no extra charge for more transmitting flexibility! A low-impedance microphone is recommended with a wiring schematic and plug parts included. My Akai audio-tape recorder mike is working just great for subcarrier audio to a station 23 miles away with the mike in my shirt pocket. Communications still can be detected 8-10 feet away as I move around the shack. The jack is wired for grounded transmit push to talk. The microphone on my RCA-007 B/W Video Camera also works quite well and utilizes transmit keying at the camera. A large heatsink is used on the back of the cabinet that just barely gets warm after a half-hour keydown period. I had Mike install a sync-stretcher circuit at the video modulator (available in kit and assembled form) and I get nearly 40 watts of clean video picture on my MML432-50 linear amplifier. A large, easy to read manual accompanies the rig with large detailed schematics and instructions. The SILVERNAIL SE1a ATV TRANSCEIVER retails at \$374.95 and carries a 1-year guarantee on components and workmanship except for semiconductors which carry a 90 day guarantee. The SE1a unit is an ideal unit for base, mobile or portable operation. Thanks Mike for a well designed and working addition to Amateur Television!

SILVERNAIL ELECTRONICS, INC.
14061 - 111 TERRACE NORTH
LARGO, FLA. 33540





ALL ABOARD TVRO

How to Build Your Own Satellite Receiver.

1st of a seven part series.

Within the next seven forthcoming issues, step-by-step "module" projects will explain how to construct and operate a earth satellite TVRO receiver.

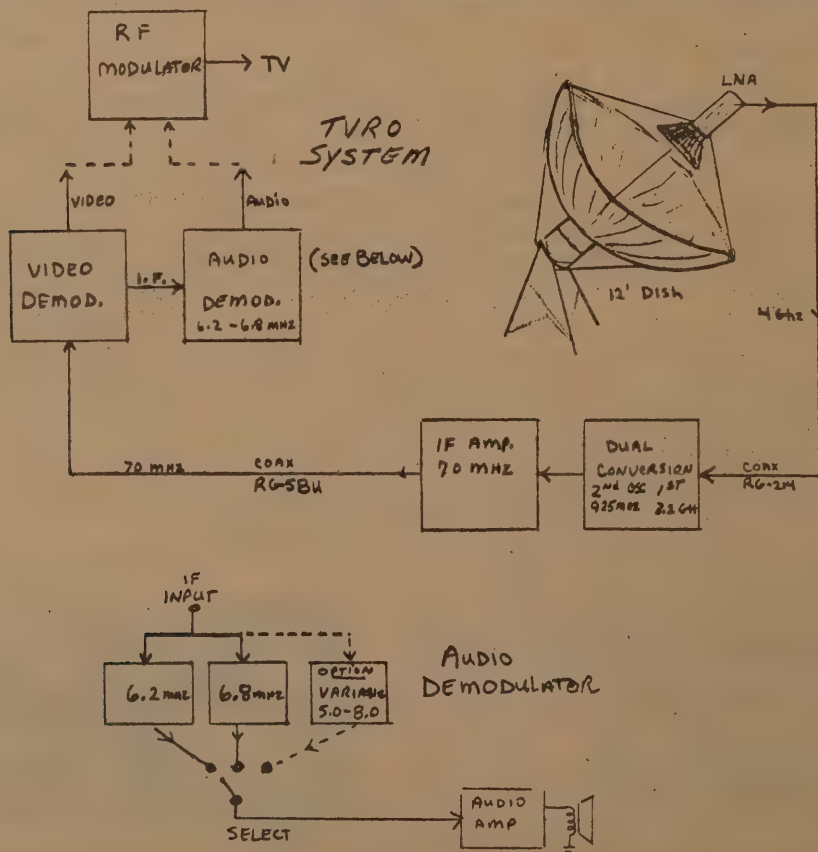
As illustrated in the block diagram, basic building blocks are required, and some of them (such as the LNA) may be purchased rather than built, depending on your abilities or willingness. Stick with us all the way and build a dual conversion receiver with all the goodies. If you are not yet familiar with TVRO, I suggest reading old issues of Radio Electronics or some of the other magazines currently available on the subject.

If you start now and keep up with the flow of articles, you'll be watching those first run movies in no time. You have two months to complete the AUDIO board shown. I completed one of them in one evening! You have two choices to make within audio circuits shown. The first choice is the "3065" circuit, since it has more selectivity and gain. The second choice is the "2808" variable frequency unit which can be breadboarded in one evening.

TVRO audio is FM and is usually 6.2 or 6.8 Mhz above the video, depending on which satellite or transponder you are watching. Sometimes the audio is transmitted on other frequencies other than the 6.2 or 6.8. For this reason a variable receiver is nice to have. Some channels may offer stereo, so two receivers, independant of each other would be necessary.

I recommend building the first choice using the 3065 for the 6.2 and 6.8 (you must build two) and switching from one to the other. 99% use these two frequencies, and then later build and add on the variable unit if you want the oddball stuff. If you plan on using your stereo or other audio amplifier for the sound, you can delete the audio amp portion of the circuit.

Tune up is simple using a signal generator injecting a FM tone. Hook detector probe from scope on to the emmitter leads and tune 9051 coils for maximum. Hook to line audio next and tune 9052 coil for max. You should be able to hook up the I.F. input to your 40M antenna and hear lots of activity. (Although FM, SSB and CW should be heard as a "acid test").



If you are building the Second choice, you can simplify things by doing away with the vari-cap diode and installing the "manual" air trimmer as shown in the alternate circuit.

It's more than likely you will have to spend around \$400 to \$800 to build your TVRO station less antenna. The cost will be spread out over the next seven issues, and also keep in mind that 3 parts contribute to the major cost. These parts are: 4Ghz balanced mixer at \$85, Voltage tuned oscillator \$120, GasFet 4Ghz transistors \$30.

The LNA (low noise amp) uses 4 transistors, but we will discuss that later on down the coax. The rest of the parts are mostly common variety that you may already have.

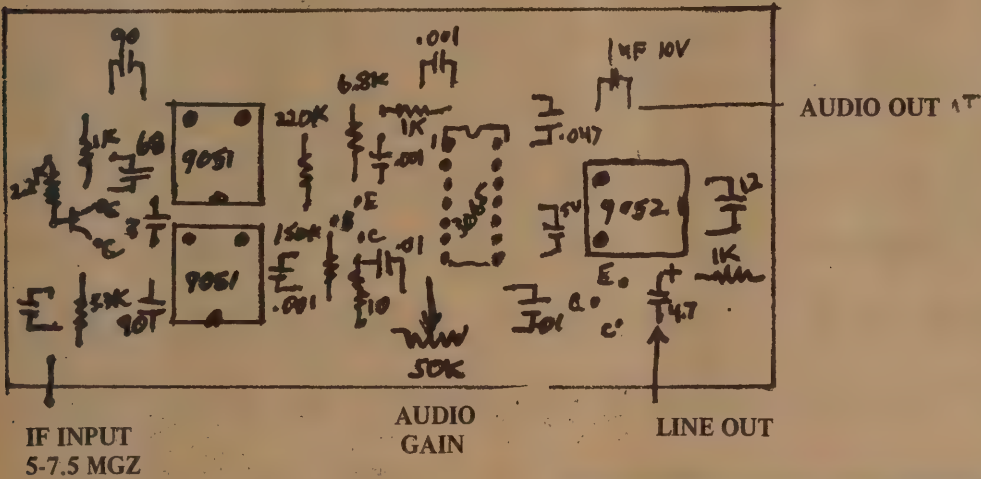
Any comments, hints or other vulgar remarks contributing to the betterment of this series may be addressed to me %System Electronics, P.O. Box 241, Glen Ellen, Ca. 95442. I will include these in the next issue for others to share. Miller coils may be purchased from most electronic suppliers such as Newark or Allied, or send \$4 for each 9051 or 9052 to: SYSTEM ELECTRONICS, P.O. Box 241, Glen Ellen, Ca. 95442. I will pay postage, so what a deal to get you going!! Well, what are you waiting for? On your mark, get set

73's Gerard Wilson
WA6RDA

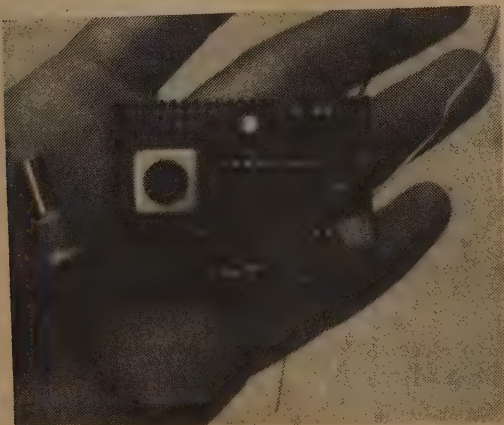
1st Choice

FIXED TVRO AUDIO RECEIVER PARTS LAYOUT

Shown Actual Size, Tune to 6.2 or 6.8 MHZ



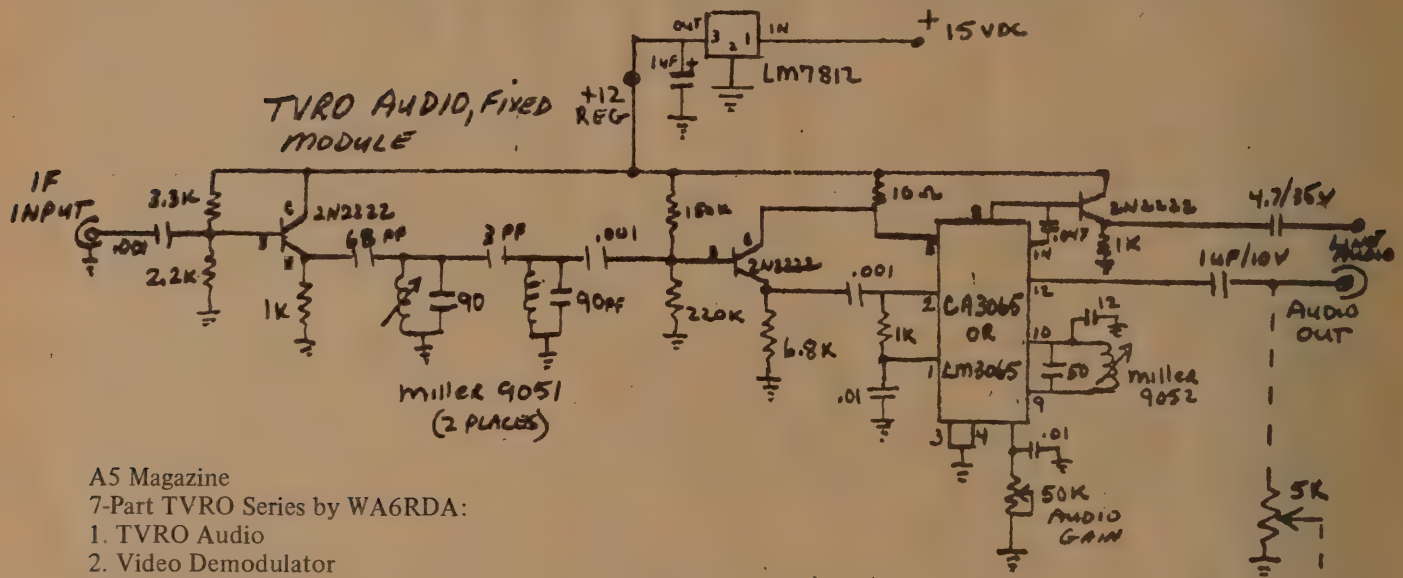
THIS UNIT HAS AUDIO AMP. BUILT IN.



TVRO AUDIO 2ND CHOICE

A simple tunable receiver covers 5.0-8.0 MHz. This breadboard construction was a one evening project. It uses a LM2808.

"Start now!" This series will be done by the September issue of A5 ATV Magazine!



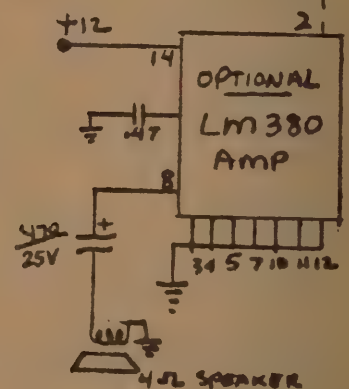
A5 Magazine

7-Part TVRO Series by WA6RDA:

1. TVRO Audio
2. Video Demodulator
3. 70 Mhz. IF
4. Dual Conversion Unit
5. Power Control & Video Modulator
6. LNA & Supply
7. 4 Ghz. Antennas & Feed

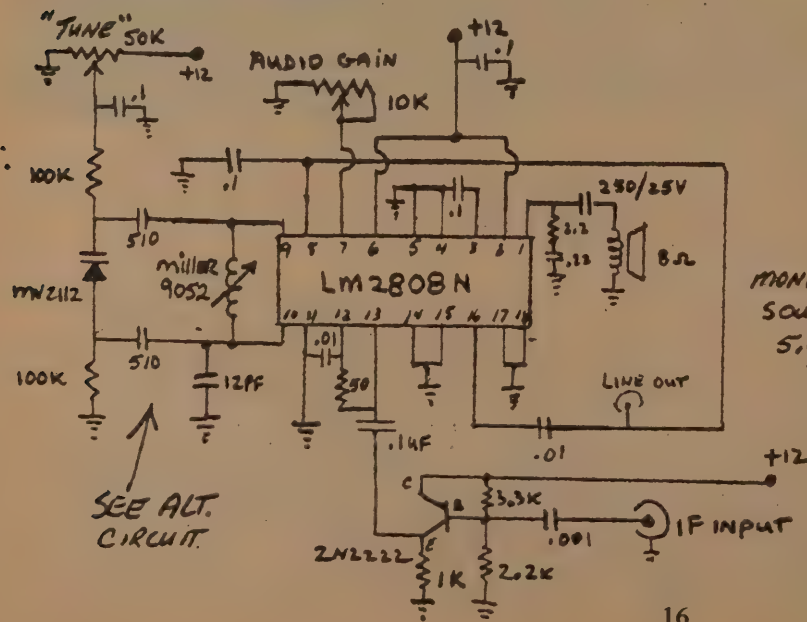
(Back issues or single articles available WBØESF - see back cover).

WA6RDA Gerard Wilson, P.O. Box 241, Glen Ellen, Calif. 95442

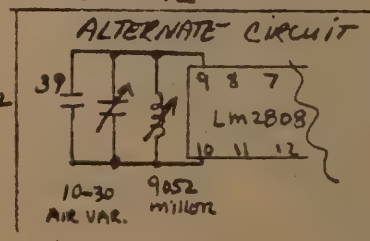


2ND CHOICE

TUNABLE AUDIO MODULE



MONOLITHIC TV
SOUND SYSTEM
5.0 - 8.0 MHz

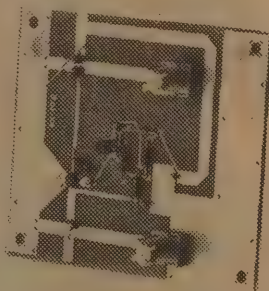


SYSTEM ELECTRONICS

WHIP AW-1

Adjusts up to 6 5/8" for use with mini-cam or remote back to shack. BNC connector. \$5.00

ONLY \$5



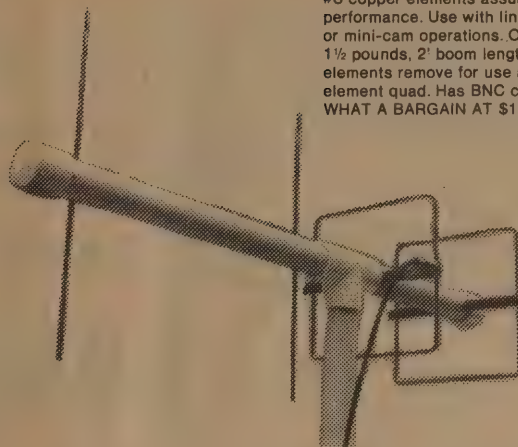
\$27

PREAMP, WIDEBAND FOR ATV.

70E & 70EX Rock stable performance with MPS3702 bias ckt. works super from 0-150 degrees F. Can be powered THRU coax if mounted at ant. 14ma at 12 vdc. 50 ohms in and out. Approx 4"x4".
70E approx 16db gain 1.7nf ... \$27.00
70EX approx 20 db gain .9 nf ... \$57.00

4 Element Quagi AQ-4

Portable, rugged, designed to get ATV out of the shack! #8 copper elements assure top performance. Use with link-ups or mini-cam operations. Only 1 1/2 pounds, 2' boom length. Yagi elements remove for use as 2 element quad. Has BNC conn. WHAT A BARGAIN AT \$19.80



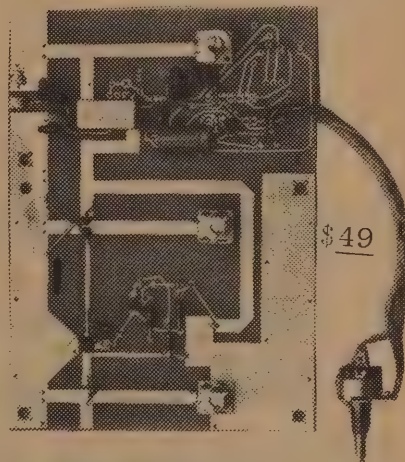
\$19.80

PLEASE NO C.O.D. SHIPMENTS!!

WE PAY SHIPPING ! On all orders \$25 or more, within USA.*****

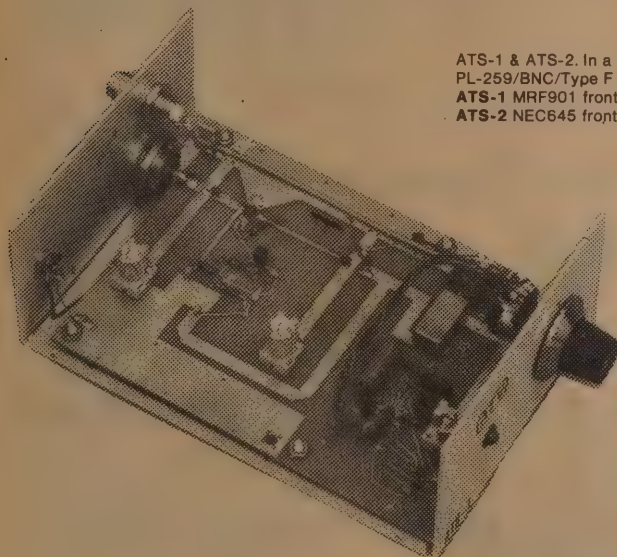
RECEIVER CONVERTERS.

All ATS converters tune 420-450mhz and converts down to ch 2 or 3. MPS 3702 bias Ckt assures stable MRF901 or NEC645 at front end. Double balance mixer along with stripline construction assures hottest performance available.

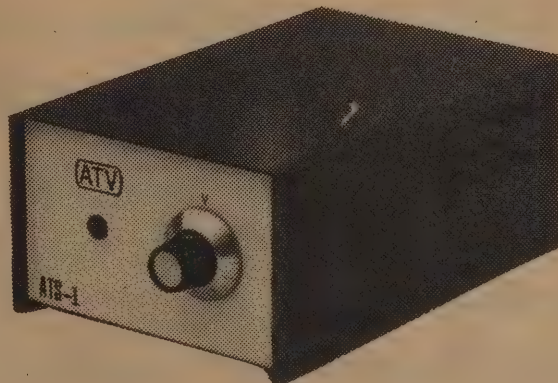


\$49

ATS-1 & ATS-2. In a box complete with 110vac supply, PL-259/BNC/Type F connectors (Type N upon req.)
ATS-1 MRF901 front end ... \$79
ATS-2 NEC645 front end ... \$109.00



\$79

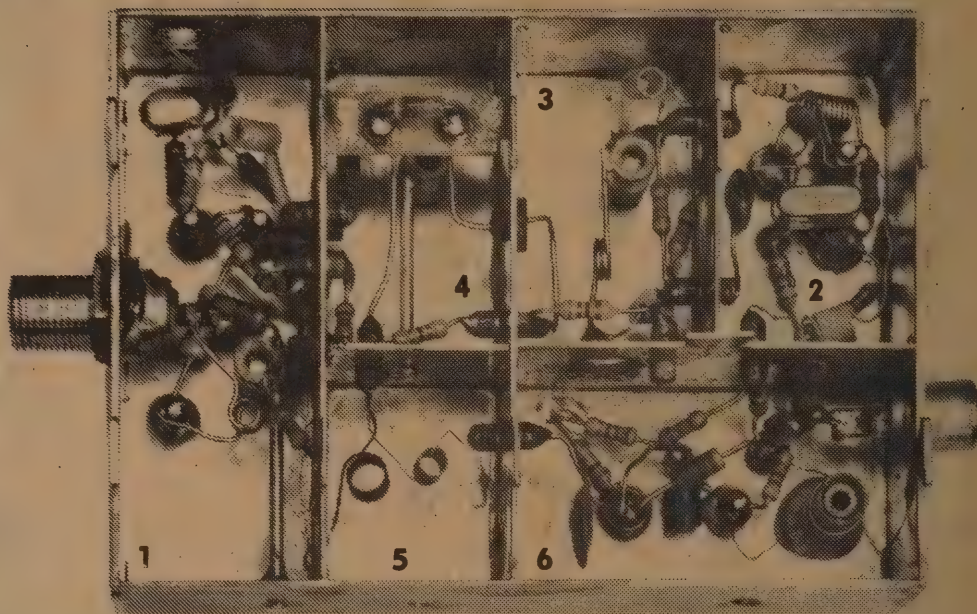


SYSTEM ELECTRONICS P.O. BOX 241
GLEN ELLEN, CA. 95442

NEW!

from Science Workshop **UHF TO VHF XTAL CONTROLLED DOWNCONVERTER**

**JUST
ARRIVED**



- 1. HI-GAIN LO-NOISE UHF PRE-AMP STAGE. (Q₁)**
- 2. 5th OVERTONE CRYSTAL CONTROLLED OSCILLATOR. (Q₂)**
- 3. OSC MULTIPLIER STAGE. (Q₃)**
- 4. DIODE MIXER STAGE. (D₁)**
- 5. V.H.F. (I.F.) FILTER.**
- 6. V.H.F. (I.F.) POST AMPLIFIER STAGE. (Q₄)**

NOT A KIT!
MADE FOR PAY TV
ONLY \$19⁹⁵
PLUS 1.50 UPS

SUPPLIED WITH CRYSTAL THAT CONVERTS UHF-TV CHANNEL 20 (507.25 MHz) TO VHF-TV CHANNEL 3 (61.25 MHz). WILL ALSO RECEIVE UHF CHAN. 21 ON VHF CHAN. 4 AND UHF CHAN. 19 ON VHF CHAN. 2.

POSSIBLE APPLICATION FOR ATV (OR OTHER UHF CHANNELS) BY CHANGING XTAL AND RE-TUNING

HOTTEST UNIT WE'VE COME ACROSS IN YEARS!

RUSH YOUR ORDER TO: Science Workshop Box 393 Bethpage, N.Y. 11714

"GET EM' WHILE THEY LAST FOLKS! JUST WHAT EVERY HAM TV'ER NEEDS IN THE SHACK FOR ALL THOSE "PROFESSIONAL" PRODUCTIONS! BE THE FIRST ON YOUR BLOCK TO HAVE ONE!

While I was working Dave, WA6MON one day on 28 Mhz SSTV, he showed me his latest buy and I fell in love with it and had to get one! Dave stumbled on them at a novelty shop in Hollywood, California that specializes in the "goodies" from the Movie industry. They work great for those FSTV transmissions, videotape separations and even work well in SSTV reproductions. If you are interested in one of these little jewels, contact Dave Darr WA6MON and send \$20.00 which includes return postage. (You supply the chalk) "What's next Dave, Director Chairs?" -WB0QCD



Looking for a way to better "light" your ATV Shack?



Most hardware or discount stores carry these neat little metal or porcelain single or dual light fixtures for around \$10.00. A simple replacement of the rooms' 60 watt light bulb fixture that hangs down in the center of most rooms adapts nicely. Obtain 150 watt (120 volt) FLOOD light bulbs (not spotlight) and view a "new" studio room on camera! The fixture can be easily rotated to any angle or direction to eliminate shadowing. Run one bulb toward the operating position and the other bulb toward the sign material on the wall. Lighting being directed from above, is not as uncomfortable to the operator and highlights the entire surroundings as well as the area photographed. The wall switch makes an easy on/off location with no extra wiring or bulky portable clamp on lighting units. A dimmer switch installed in the circuit makes a perfect controllable light level for the photos. This is especially helpful for low-level light cameras. The new flood-lighting system is especially noticeable during the evening hours.

EVERYTHING YOU ALWAYS WANTED TO KNOW ABOUT ATV* but were afraid to ask

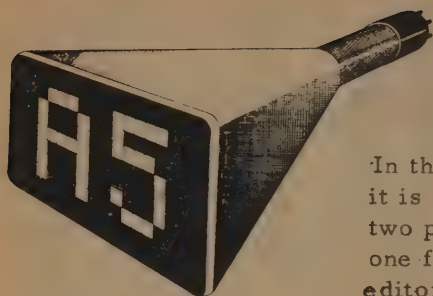
A "NEW" publication for ATV'ers, by Mike Stone WB0QCD of A5 ATV MAGAZINE is at the printers and will be released at Dayton 1982 in April. Many of the contributions by Henry Ruh KB9FO in the respected ATV IN A NUTSHELL book are there along with many new updated articles on Amateur Television by such experts as Tom O'hara W6ORG, Mike Silvernail WB4BNJ, Gerard Wilson WA6RDA, Mike Collis WA6SVT and others. Anticipated at nearly 100 pages, there are 10 chapters covering everything from the History of ATV, How to get started, Equipment Directory, Video Theory, Cameras, Transmitters and Receiver Circuits, Subcarrier Audio, Videotape units, Portable operation, Filters, Linears, Buffers, Inverters, Video Iders, Test equipment, Test Patterns, Antenna projects, ATV Repeater listings, How to build an ATV Repeater and a listing of over 700 articles published on ATV. Reserve your copy now! Only 1,000 copies will be printed. Send \$9.95 to A5 ATV Magazine, PO Box H, Lowden, Iowa 52255-0408 (April delivery)

Add 2.50 For
Postage and
Handling



Amateur Television Magazine

DEVOTED TO HAM TV



SSTV

FCC ADOPTS DOCKET 80-252

ROBERT ROCHRIG & HENRY RUH PROPOSALS APPROVED

FCC approves SSTV-FAX in general HF bands February 22, 1982.

In this day and age of loss of privileges, frequencies and out of date policies, it is refreshing to see the FCC adoption of Docket 80-252 which consists of two proposals; one for Facsimile operation presented by Robert Rochrig and one for SSTV operation (use in the General phone bands 10-80 Meters) then editor of A5 Magazine (KB9FO) Henry B. Ruh. The FCC announced a Notice of Proposed Rulemaking concerning RM-3239 and RM-2861 in June 80 with comments on the legislation to be filed in Washington by September 1980. A5 ATV Magazine immediately went to press of the announcement and with the September/October issue conducted a reader poll as to what frequencies to be

best utilized by Generals on the HF bands. Over 50 responses were returned in the fall of 1980 with recommendations for all parts of the bands. Discussion over-the-air on 28.680 Mhz. dwindled as fall passed onto winter and then spring of 1981 with no decision by the FCC. The proposal was considered "dead" by many SSTV enthusiasts until the November 1981 announcement of formal adoption of Docket 80-252.

The general feeling of many SSTV'ers, is that one unified SSTV frequency would be most beneficial & sure to gain dominance in the area of chosen operation. Unfortunately, with upgraded licensing comes a feeling of human upgrade for some, and a single unified SSTV operating area will certainly fall short of expectations. It is hoped, that all SSTV'ers (regardless of class of license) will join together in the 2nd chance of establishing a practical and workable SSTV operating area. During the discussion in December on 14.230 Mhz. concerning the new General operating frequencies, one station on the Net was injecting how well respected and accepted 14.230 Mhz. was for SSTV operation while a nearby station was spluttering above and another was starting a CQ-DX call right on top of him. It is quickly realized that the new areas of operation won't be much better, but if intelligent decisions are made as to the best non interfering areas to populate, success eventually will be achieved. Plans are underway, by General Class operators, to establish a regular 15, 20, 40 and 80 Meter Net staggered at different days of the week. It has been proposed that a Monday night Net on 40 meters starting at 8 pm. EST, a Wednesday night net on 80 meters at 8 pm EST and a Sunday afternoon net on 20 Meters at 2 pm EST be quickly established to begin recognition of the new mode on the new band areas. These nets in conjunction with the regular established 14.230 Mhz. Advance/Extra Class SSTV Net and Thursday evening "technical net" round out a well balanced SSTV group gathering at different days and times of the week. Volunteers to run these nets are requested. Send your interest requests to WBØQCD.

Discussion of frequencies: Study has been made by A5 ATV Magazine as to what frequency areas are most suitable for SSTV operation with minimum QRM and other mode interference. To discuss this, we must individually cover each individual band to be used; 10 Meters- The established frequency is 28.680 Mhz. When decided upon a few years ago, the ten meter band was not populated in the upward areas & the present calling/operating area was a good choice. Today, things have changed drastically. The 680 spot is right in the middle of all activity including DX operation, Ten-Ten and YL Nets, and general rag chew operating areas. During phone "contest" operation, 28.680 Mhz. is a disaster for SSTV operation. Many (especially the COLOR buffs) have moved up to 29.180 Mhz. for peaceful relief. It is felt that the abandonment of 28.680 Mhz. immediately would be mass confusion worldwide for SSTV'ers and the continuance of operation in this segment until January 1983 would provide a transition period allowing the word of an anticipated frequency change to filter out. Some foreign SSTV'ers, such as in Argentina, are not able under certain classes of licenses to operate below 29 Mhz. The need for a higher calling and operating area is soundly needed. Suggestions have been made for 28.990 Mhz. which follows with the top ten hz. theory proposal discussed later. 15 Meters- Probably with the most potential for excellent worldwide SSTV DXing during the downward swing of the sunspot cycle. A vastly unorganized area in the upper portions on non-net activity. Some phone-patch traffic around 21.370 Mhz. and Emergency Nets in the mid portion of the band. 20 Meters- Perhaps the band that will be the best all around band to utilize but also the toughest to establish a foothold of recognized operation. DX operation from the bottom to mid portions including Advance split receive operation. Nets all over the place including the Weather related emergency Nets around 14.325 Mhz. area. 15 listed nets occupy the lower to mid-positions with many more unlisted net operations. Phone-patch traffic again around 14.330-14.440 with rag

chew on all portions-spaced out near the top end segment. 40 Meters- The best daytime and nighttime band for US Amateurs (MUF) with net operation scattered all over. Interfering shortwave broadcast intrusion at different places on the band dependent upon propagation characteristics. The most likely place to dominate is the middle or top end of the band. 80 meters- The real "nightmare"! Daylight operation limited to local exchanges between neighboring states, with all of the kooks and wierdos appearing as the moon arises (connection?). Ragchew operation everywhere, seemly less populated toward the band edges. 160 meters- Not available for SSTV operation. Two theories of thought have been proposed by responding Amateurs; 1. Populate the lower portions of the band-nearest to Advanced/Extra Class SSTV frequencies for minimum frequency change and antenna SWR tuning or 2. Populate the "top end" segment (10 hz.) assuring minimum interference from the top end of the band due to out-of-band operation. IT IS THE RECOMMENDATION OF A5 ATV MAGAZINE THAT THE TOP TEN HZ. OPERATION BE CONDUCTED. Operating away from the lower and middle portions of the band reduces interference from the DX operators & Net and general ragchew operation. As the radio operator nears the top band edges, they become conscious of where they are operating. Also antenna SWR increases for those who are tuned up at lower frequencies. The fact of non-interfering Amateur operation from above out-of-band restrictions ensures less operation by the non-specialized communication operator. The discouragement of SSTV/FAX signals always at the top end of the bands will additionally "scare away" most regular phone stations. Establishment of regular Net and "self protecting group activities" will ensure domination of the band use areas. A5 ATV MAGAZINE recommends the following General Class (and above) calling and operating areas:



Band	Calling & Operating Area (Bandedge protection)	
80 Meters	3,990 to 4,000	(3,998)
40 Meters	7,290 to 7,300	(7,298)
20 Meters	14,340 - 14,350	(14,348)
15 Meters	21,440 - 21,450	(21,448)
10 Meters	28,680 - 28,690*	(till Jan. 1983 then 28,990 Mhz.)

SSTV

In SSTV circles, the term "calling" frequency does not necessarily mean to make the call and then QSY off to another frequency. The abandonment of a recognized area that remains quiet means a sure loss of frequency to a SSTV operator. The use of the calling frequency with proper time periods for the exchange and entering of "breaking" stations is the rule of thumb. Movement "upward" only into the top end segment (watching the band edges) and utilizing "group" operation will maintain success and recognition of SSTV operation. IT IS IMPORTANT TO KEEP IN MIND THAT ONLY THRU TACTFUL AND CALM EXPLANATION TO INTRUDING OPERATORS OF SSTV OPERATION WILL UNDERSTANDING BY OUR AMATEUR BROTHERN BE RECOGNIZED.

Certainly, with the rise in SSTV activity conducted on the 40 and 80 Meter bands, 256 high-resolution or 128 X 128 1/2 speed 17 second (or longer) pictures) will be utilized with the proven increase in multi-path signal interference. Studies by US Navy MARS SSTV operators on the 40 and 80 meter bands, have demonstrated the great increase in reliability of picture exchange at the slower clock speeds. Recent modifications to the popular Robot equipment and multi-mode features of the German made Wraase SC-422 converter will allow the SSTV operator to operate all bands successfully. COLOR SSTV experiments conducted in the early 1970's proved that the COLOR multiframe actually improve resolution results. It is this challenge that SSTV will advance in popularity. As in the past, only through unselfish, non-profit motivated individuals will the mode we all love so much be advanced.



Facsimile- FAX has been operated by Amateurs (many prior to SSTV) in 6 Meters and above in VHF portions of the bands with much success. FAX signals can be heard very regularly on the ten meter SSTV calling areas by foreign stations in Japan. Certainly, it will be the SSTV operators who further develop FAX as a method of hardcopy direct picture transmissions. SSTV is sometimes referred to by FAX operators as Fast-FAX with similarities in modem transmission and reception. The older Western Union Desk Fax equipment that lays around at hamfests for \$5-20 dollars dependent upon condition and conversion, will be revitalized by the Amateur with renewed emphasis on more updated modern equipment using standard 8 X 11 paper. A5 ATV Magazine begins with this issue a review of Facsimile articles and equipment available to the Radio Amateur. A separate operating frequency for FAX would be doomed to failure unless incorporated into the SSTV operating areas. FAX should be operated toward the higher band edges. On behalf of all SSTV Amateurs, a "special" thanks to Robert Rochrig and Henry B. Ruh!

This "review" was published originally in the Nov/Dec 1980 issue of A5 ATV Magazine. CQ Magazine Editor K2EEK liked the new SSTV converter and with permission ran the review as an article in the April 1981 issue of CQ Magazine. Since its' introduction to the U.S. marketplace, Volker Wraase has opened a U.S. Distributorship with KW Control Systems in Middletown, New York. With the popularity of COLOR SSTV growing in the ranks of Amateurs, A revised NEW SC-422A model 3-memory COLOR SSTV Converter was introduced in January 1982. The NEW SC-422A unit has essentially the same features at the reviewed SC-422 with updated modifications as shown at the end of this article. — QCD

CQ REVIEWS



The Volker Wraase SC-422 SSTV Converter with the optional KB-422 ASCII Keyboard.

The Volker Wraase SC-422 Two Memory SSTV Scan Converter and KB-422 Keyboard

BY MIKE STONE* WB0QCD

Not all the hoopla in electronic design and packaging finds its way to our shores via the Orient. The product about to be reviewed was a quiet entry into the U.S. market during 1980. Starting with a modest display at the last Dayton Hamvention, and more recently at the New England Boxboro show, the units have drawn attention from avid SSTVers and neophytes alike. It's not a cheap price for a new mode that sparks this attention, for there are certainly far less expensive routes one could travel to reach the same desti-

nation. It's simply the all-inclusive nature of the product that beckons the curious, for the price admittedly is high. While the ultimate destination may be the same, how you get there, which options, ease and style are ultimately the factors you pay for.

The following resulted from a review I read in A5 magazine recently and the ensuing letters with the author, Mike Stone, WB0QCD. A5 is a magazine devoted to amateur television and as such caters to the avid SSTVer. As with any special-interest

magazine, those with a peripheral interest or knowledge and those hearing of the subject for the first time may not be aware of the material available on the subject. This review will then serve to familiarize you with a new product and another source of information within the specialty. I want to thank Mike and Henry Ruh, KB9FO of A5 for permission to use this material. For more information on A5, write to: A5 Magazine, 7391 W. Hwy 46, Ellettsville, IN 47429.

—K2EEK

In wine, it's the French '67 Chateau d'Yquem or the German '76 Dr. Thanisch Bernkasteller Auslese. In automobiles it's the Mercedes or Porsche. In cigars it's Havana or Jamaican Macanudo. But in Slow-Scan Television it's Volker Wraase's SC-422 Converter and matching keyboard! Many of you have never heard of the name. But mark my words—before the year

has ended you will be seeing more and more of these fantastic little machines on frequency. I feel so excited about this new product now available stateside for the first time that I sold my Robot 400 SSTV Converter to acquire the system. I found it hard to believe that anything could top the 400 converter with its already excellent picture reproduction quality and 4K memory. Well, move over Robot, here comes your new competitor!

I first became acquainted with

DL2RZ's work when I began working many European SSTV stations who boasted of the SC-421 early model units. I saw "tricks" being done with the video that I never saw any stateside stations do. I wrote Volker Wraase for some printed material, but the return mailing needed a German translator to understand what was stated in the brochure. Then I worked Gerald, ZS6BTD, in South Africa several times on 10 meters as he demonstrated his new 422 model. Meeting

*P.O. Box H, Lowden, Iowa 52255

with Volker at the spring Dayton Hamvention for over two hours and carefully examining the SC-422 unit on display, I was sold! The next step was to contact the newly authorized U.S. distributor in New York. My contact with Mr. Walter Giesser at KW Control Systems, Inc. in Middletown, New York brought immediate results! It seems as though the multi-million-dollar company produces the "Piller" (TM) line of power control generators, frequency converters, redundant systems and diesel generators for the "computer world." Who are their customers? Only businesses like IBM, Commonwealth Edison, GTE, Lockheed, all kinds of insurance companies and universities. Mr. Giesser's "baby" is a unit that retails at a mere \$8,350 and remotely analyses internal meters and LEDS within the large power systems via Phoneline Slow-Scan Television. And, guess what is the heart of this "watchful eye" that saves thousands of dollars every day for the computer industry? Right, Volker Wraase's SC-422 converter. Well, knowing your interest is at a peak, let's continue on with the specifics of the review!

SC-422 Specifications

With experimentation being done on Color SSTV and Medium Scan Television, what could be more natural than a 2 memory converter? No need to buy extra boards of expensive chips and a nightmare of interface wiring, just flip the 3-way switch on the 422 and you take command of memory #1, memory #2 or a combined 256 rendering that will make your mouth drop when compared to the popular converters on the market today with unmatched resolution. To be fair, Robot's model 400 uses 256 rendering but displays only 128 pixels by 128 lines. The SC-422 has 16K RAM of memory and 128,000 bits of memory capacity in comparison to 4K and 65,000. The popular 400 model has 8

shades of grey levels, whereas the SC-422 has 16 levels for better coloring and shading. Memory #1 can be dumped on the air while you are "setting-up" memory #2. Interesting artwork can be formed by intermixing the two memories with proper individual pictures that can "lay" on top of each other.

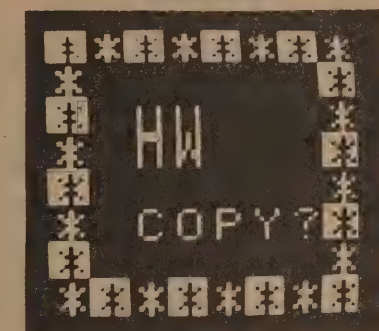
A surprise bonus became apparent on my first contact, as when the sending station stopped his video, the picture automatically locked up in memory and did not paint "noise" as my previous unit! (No more "sorry for the noise on top" routine.) Unlike the generated grey scale on the bottom of the picture, the SC-422 employs its 8 level scale at the top of the frame with the belief that a picture not properly tuned until the bottom of the frame is a poor picture. An easy to read LED tuning indicator for the SSTV signal and built-in filter assure proper signal alignment. A tunable pot for correct syncing also allows copy of non-standard color and sync tones (other than 1200 Hz sync, 1500 Hz black and 2300 Hz white).

The Camera "see through" (FSTV) setup is similar to operation of the Robot 400. The big advantage is utilizing the two memories of storage. Individual controls for contrast and brightness align the camera for a proper picture. Black/White reversal is standard and a special built-in SSTV output filter for distortion-free output of the sine wave signal really cleans up the act! For improved displayed pictures, a switchable Dot/Line blanking raster control is mounted on the rear of the unit which allows the operator to select a 256 dot raster or 128 line structure. This does not affect the picture output.

The converter itself is remarkably small and very lightweight (12" x 4" x 7"). It is housed in a very attractive black and silver all aluminum cabinet. All solid-state, the unit also houses the power supply for the matching keyboard. All connectors are standard



KEYBOARD KB-422



Any picture in the memory of the SC-422 can be used as a background for the alphanumeric information generated by the keyboard.

SO-239, BNC, etc., except for the audio cables which are supplied. An optional accessory tool that would be desired by those not getting the keyboard or for those who like to draw is a "video-pen" that attaches to the converter and allows writing on the monitor screen (bit change). Certainly, this SSTV converter is ahead of its time and is the "Cadillac" of Slow-Scan Equipment. Unfortunately, not all of us can afford "Cadillacs," but considering the design preparation, size, memory, filtering, and special effects, not to mention overseas shipments, duty tariffs, distributor advertising and promotion and "at home" (NY) repair service, it isn't a bad buy at \$1,184. Volker Wraase SC-422 SSTV Converter carries a one-year warranty on all parts and materials.

The KB-422 Keyboard

A further compliment to an already "fantastic" system is the KB-422 SSTV Graphic Keyboard. Gold-plated contacts represent "nothing but the best" for this ASCII keyboard. It has the standard 26 character alphabet, ten numbers including a slant 0 and 28 special characters for punctuation and special effects artwork. The unit displays 8 lines (small format) and 4 lines in the large format.



The SC-422 has two full-size SSTV picture memories.

A switchable Black on White (BOW) and White on Black (WOB) control backgrounds the character which can be alternated with each character (unlike other SSTV keyboards that can only "reverse" the entire frame). Okay, ready for the BIG NEWS? *The graphics can be superimposed over any video picture in memory!* Now think of the possibilities! The unit has a non-interfering but recognizable "cursor" that tells you where you are for insertion. The special "delete" key erases any

character or background video not desired. The KB-422 Keyboard is so small and lightweight that it will fit anywhere. The KB-422 can only be used with the SC-422 SSTV Converter and retails at a reasonable \$296 including a one-year warranty. You should see the amazement when I return the sending station's self-portrait with his call sign and name typed in with the picture. The usual response is "What type of computer are you running there?"



KW CONTROL SYSTEMS, INC.

R.D.#4, BOX 114C, SO. PLANK RD., MIDDLETOWN, N.Y. 10940

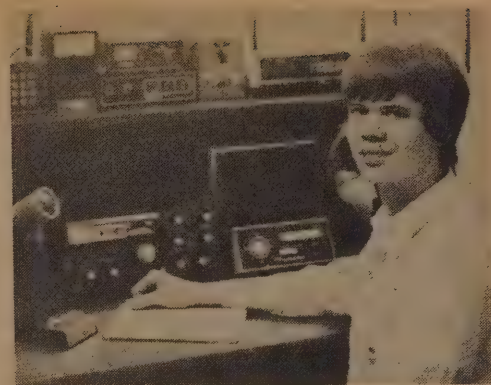
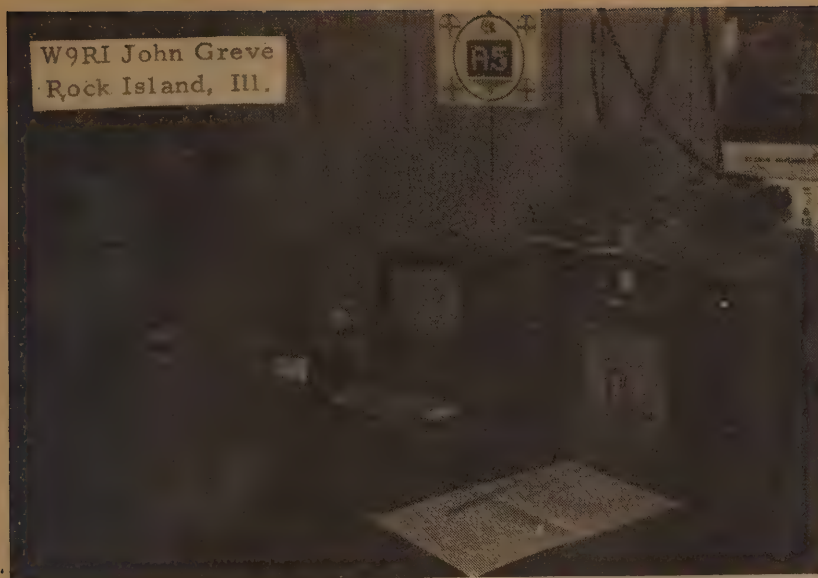
**VOLKER
WRAASE**

3-MEMORY COLOR SYSTEM
*Featuring Motion Animation and Colorflash!

SC-422A

SSTV Scan Converter

KW CONTROL SYSTEMS, INC. (US Distributor in Middletown, NY) proudly announces an even better VOLKER WRAASE SC-422A updated SSTV converter offering more features, in a smaller size unit, and for comparatively less money invested than the warranty-voided Robot 400 modified units. The NEW SC-422A SSTV converter is a 2-memory manufactured unit with an available plug-in 3rd memory and individual outputs for COLOR SSTV reception and transmission! The "package" concept by KW CONTROL SYSTEMS, INC. includes the 3-memory SSTV converter, the KB-422 Color and B/W Graphic-keyboard (with memory overlay) and the LG-422 Video-light pen and optionally available wired Color TV set. The "features" of the new SC-422A system are basically the same as the previous SC-422 system with some updated modifications; addition of the new 3rd memory, high-resolution 256 pixel by 128 line 16 second receive and transmitted capability, motion SSTV receive/transmit or Colorflash, improved FSTV "see thru" for Camera alignment and Color keyboard-lightpen special effects and scales. Loading of the RGB sequence is done by only two switches with perfect overlay and coloring. An internal adjustable "receive sync" control allows the operator to realign on off frequency sync drift stations (or tape recorder differences) without shifting the VFO transmit frequency of your own station. Interface of the standard B/W camera to the converter through the individual memory outputs into the color-guns of the TV set allow Color SSTV pictures to be transmitted with the use of popular gelatin-filters. High resolution 256 X 128 frames can be viewed and sent by combining memories 1 and 2 together. The quality of high-resolution SSTV pictures is dramatically increased when compared to the 128 X 128 format and will certainly become the mode to operate on 40 and 80 Meters due to multipath interference. A selectable 256/ or 128 dot or line CCTV display offers the user more flexibility of viewing than can be found on any other SSTV system. The feature that sets the SC-422A apart from all competition is the COLOR Graphic Keyboard and Light Pen system. Generated graphic lettering, (two sizes and background combinations BOW-WOB or transparent), can be OVERLAYED into any picture in memory! With experimented use of Color "overwrite", special effect multi-colors can be created unmatched by any other system. Motion SSTV or Colorflash is done by the automatic switching between memory pictures at two speeds. Automatic memory alternation can be transmitted or received also which is great for CQ sequences or contests. The complete SC-422A system which includes the 3-memory option, KB-422A keyboard and LG-422A Video lightpen sells for \$1995.00 US. This includes a one year warranty on parts and service at the New York Distribution Center. When compared to other popular Color SSTV systems, the SC-422A offers more features and flexibility in a smaller package for less cost.* (see A5 Magazine review of Color SSTV Systems next issue). My RCA Color 9 inch TV was "modified" for in-gun video insertion with the installation of a necessary AC line isolation transformer to avoid "hot chassis" problems (article on RCA conversion coming in A5) and switchable back from a Color monitor to a normal commercial TV set. A KW-CE1101 Color Matrix chip encoder board is available housed in a separate cabinet which includes power supply connectors and all cables to hook up to "any" TV set. KW CONTROL SYSTEMS will aid any Amateur in the interfacing of their Color SSTV system to any TV set with supplied schematics. See the NEW SC-422A SSTV COLOR SYSTEM at Dayton Hamvention in April. For more information, contact Mr. Walter Giesser, WB2OWX at KW CONTROL SYSTEMS, INC., R&D Dept, Rd. 4 Box 114C, South Plank Road, Middletown, New York 10940 or call (914) 355-6741 Ext. 201. (9-4 pm)

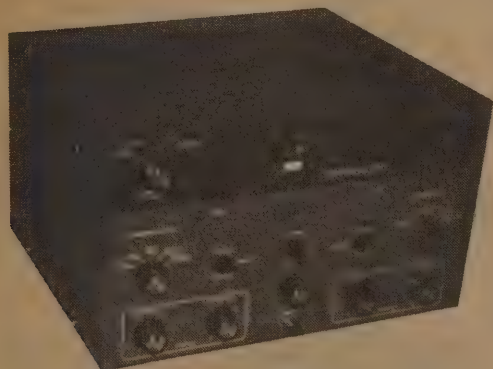


KAØBED Don Hartman Jr.
Moscow, Iowa



DL3ÜH Heinz Engelmann
Bremerhaven, W. Germ.

MODIFY YOUR ROBOT 400 FOR COLOR SSTV



COLORSCAN 403

CONVERSION KIT

- * 3 Memories (2 additional)
- * Rainbow Color Generator/Greyscale
- * Auto Servo-control for Color Filters
- * RGB or Channel 2 NTSC video outputs
- * Compatible Color Keyboard (later)

Shown in Dayton '81
Available early in '82

Syd. Horne VE3EGO
P.O. Box 893
Belleville
Ontario K8N 2G6
Canada

Article to follow in A5 MAGAZINE
May issue

ROBOT 400 owners; Here is another modification for your SSTV Converter. Just another in a series of mods. for the 400 from A5 ATV Magazine. For a collection of all past mods. write WBØESF.

SUPERIMPOSED GRAPHICS & SPECIAL EFFECTS

ROBOT 400

By TOM HIBBEN KB9MC

THERE IS NO NEED TO HAVE A COMPUTER OR SECOND MEMORY TO SUPERIMPOSE BLACK AND/OR WHITE GRAPHICS ON PICTURES IN THE ROBOT 400. BLACK & WHITE LETTERS CAN ALSO BE REVERSED BEFORE INPUT TO MEMORY. ALL THAT'S REQUIRED IS YOUR VIDEO CAMERA, ONE LETTER BOARD OR MAGIC MARKER AND THIS RELATIVELY SIMPLE MOD CONSISTING OF TWO MINI TOGGLE SWITCHES, A 4.7K RESISTER, SOME HOOK-UP WIRE AND THE UNUSED SECTIONS OF FOUR ICS ALREADY ON THE ROBOT CIRCUIT BOARD.

THEORY

ALL COMPARATOR OUTPUTS ARE COMBINED IN LOGIC GATES TO FORM THE FOUR BIT WORDS REPRESENTING BLACK, 14 SHADES OF GRAY, AND WHITE, (SEE TABLE A-2, DIGITAL CODES, ROBOT MANUAL). NOTE THAT THE FIRST SIGNIFICANT BIT IS HIGH FOR THE EIGHT DARKEST SHADES AND LOW FOR THE EIGHT LIGHTEST SHADES. ALSO THE FIRST TWO SIGNIFICANT BITS ARE THE SAME IN EACH GROUP OF FOUR SHADE CODES. BLACK GRAPHICS ON WHITE OR WHITE ON BLACK CAN BE SNATCHED WITHOUT WIPING OUT A PICTURE ALREADY IN MEMORY BY CONTROLLING THE WRITE ENABLE ENCODER WITH ONLY THE FIRST OR FIRST TWO SIGNIFICANT BITS OF DATA. I CHOSE THE LATTER. ALTHOUGH SLIGHTLY MORE COMPLICATED, IT PROVIDES MUCH MORE DRAMATIC SPECIAL EFFECTS. THE ONE BIT APPROACH, HOWEVER, IS PERFECTLY FINE FOR GRAPHICS ONLY. AN ADDED BONUS IS THAT THE ENTIRE GRAY SCALE CAN BE REVERSED BEFORE INPUT TO MEMORY BY SIMPLY INVERTING THE FIRST SIGNIFICANT BIT. THIS MAKES POSSIBLE THE USE OF ONLY ONE SET OF LETTERS,

CIRCUIT DESCRIPTION (SEE SCHEMATICS)

2 BIT MOD FROM HERE ON DARKEST AND LIGHTEST SHADES ARE CALLED BLACK AND WHITE. THE TWO MOST SIGNIFICANT BITS OF DATA FROM PINS 9 AND 12 OF U55 ARE SAMPLED BY A SECTION OF OR GATE U44. DATA FROM PIN 12 IS LOW FOR BOTH BLACK AND WHITE. DATA FROM PIN 9 IS HIGH FOR BLACK AND LOW FOR WHITE. THEREFORE BY FEEDING PIN 9 DATA THROUGH ONE HALF OF A DPDT CENTER OFF SWITCH AND INVERTING BLACK HIGH THROUGH A SECTION OF U61, BOTH INPUTS TO U44 ARE LOW AND RESULTING OUTPUT LOW FOR BOTH BLACK & WHITE. THIS OUTPUT IS THEN INVERTED BY A SECTION OF U26 AND FED THROUGH OTHER HALF OF SWITCH AS ONE HIGH INPUT TO A SECTION OF AND GATE U59. OTHER INPUT IS HIGH FROM EXISTING HIGH OUTPUT OF PIN 3 U59, BENT OUT FROM SOCKET. THE RESULTING HIGH OUTPUT FROM PIN 11 U59 CONNECTS TO SOCKET OF PIN 3 WHICH TRACES TO WRITE ENABLE SECTION OF ROBOT. WHEN SWITCH IS IN CENTER OFF POSITION INPUT TO PIN 13 U59 REMAINS HIGH THROUGH A 4.7K PULL-UP RESISTOR TO PIN 14, +5V., AND ROBOT FUNCTIONS NORMALLY.

1 BIT MOD AS STATED ABOVE, DATA FROM PIN 9 U55 IS HIGH FOR BLACK AND LOW FOR WHITE. BLACK HIGH IS FED DIRECTLY THROUGH ONE POSITION OF A SPDT CENTER OFF SWITCH TO INPUT PIN 13 U59. WHITE LOW IS INVERTED BY U61 AND FED THROUGH OTHER POSITION OF SWITCH TO PIN 13. THE REMAINDER OF U59 CIRCUIT FUNCTIONS THE SAME AS IN 2 BIT MOD.

REVERSAL FOR BLACK AND WHITE REVERSAL INPUT TO MEMORY, PIN 9 U55 IS BENT OUT AND CONNECTED THROUGH A SPDT SWITCH. IN REVERSE POSITION DATA FROM PIN 9, ALREADY INVERTED BY U61, IS FED TO SOCKET OF PIN 9 AND MEMORY INPUT.

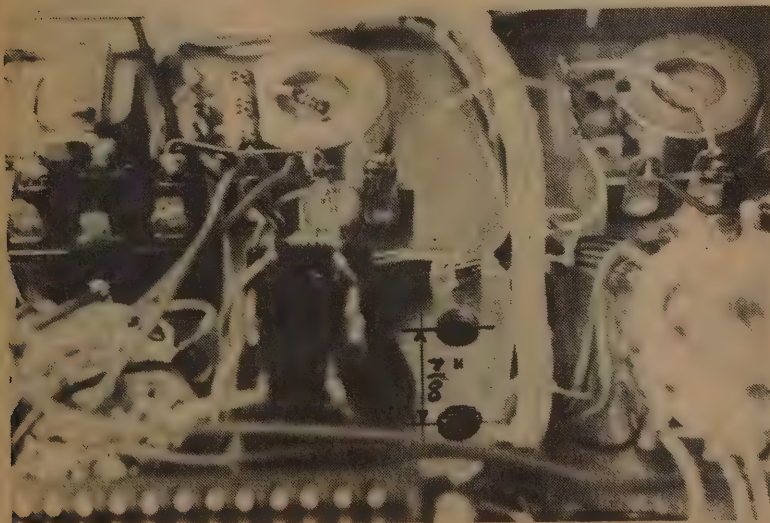
CONSTRUCTION (SEE WIRING PICTORIALS)

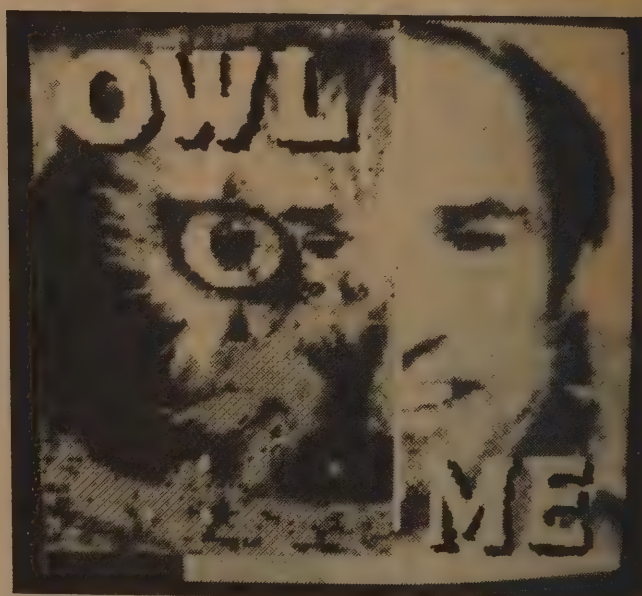
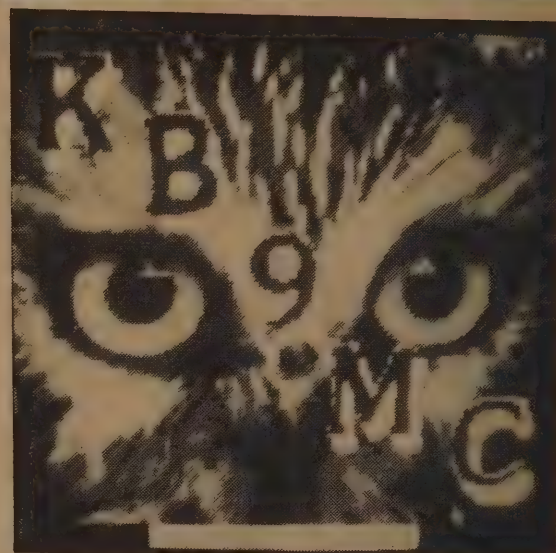
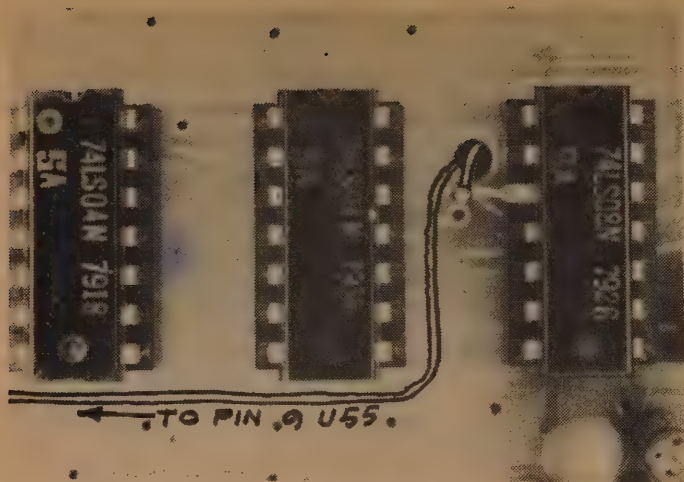
I CHOSE TO MOUNT TWO NEW SWITCHES IN FRONT PANEL OF ROBOT ALONG WITH THE 256 AND QUAD MOD SWITCHES. WHAT? BE A FEW MORE HOLES? REMOVE ROBOT BOARD AND SET ASIDE. DRILL TWO 15/64" HOLES (1/4" WILL DO) 7/8" APART THROUGH FRONT PANEL ON A LINE DIRECTLY BELOW "POWER" LED. BOTTOM HOLE SHOULD BE 5/8" ABOVE TOP OF WHITE OUTLINE AROUND RECEIVE CONTRAST & BRIGHTNESS CONTROLS. CAUTION! CHECK LOCATION OF WIRE LOOM ON BACK OF PANEL AND MOVE SLIGHTLY IF NECESSARY. LOCATE U55 (74LS157), U59 (74LS08), U44 (74LS32) AND U26 & U61 (74LS04). REMOVE U55 FROM SOCKET, BEND OUT PIN 9 AND REPLACE. REMOVE U59 FROM SOCKET AND BEND OUT PIN 3. CAREFULLY DRILL 1/8" HOLE THROUGH BOARD NEXT TO PIN 2 OF SOCKET. BE SURE TO AVOID TRACES ON TOP AND BOTTOM OF BOARD. REPLACE U59. ALL WIRING IS DONE ON BOTTOM OF BOARD EXCEPT FOR CONNECTIONS TO PIN 9 U55 & PIN 3 U59 THROUGH HOLE. WHEN WIRING IS COMPLETED MOUNT SWITCHES, REINSTALL BOARD AND IT'S TIME FOR THE SMOKE TEST.

OPERATION

DO TO USE OF ADDITIONAL IC SECTIONS AND LENGTH OF WIRE LEADS IT IS NECESSARY TO ADJUST WIDTH CONTROL SLIGHTLY CLOCKWISE. GOOD LIGHTING IS VERY IMPORTANT. SET UP PICTURE IN MEMORY. FOR CAMERA GRAPHICS SET SNATCH CONTRAST AT 12:00 AND BRIGHTNESS AT 9:00. THESE WILL VARY DEPENDING ON LIGHTING. CHOOSE A DARKER BACKGROUND FOR WHITE GRAPHICS AND LIGHTER FOR BLACK. IN ADJUSTING SNATCH CONTROLS, REMEMBER THAT PICTURE WILL BE WIPED OUT BY TOO MUCH BRIGHTNESS FOR WHITE AND TOO LITTLE FOR BLACK. FOR WHITE LETTERS ON BLACK BOARD PUT GRAPHICS SWITCH IN WHITE POSITION. TO OBTAIN BLACK LETTERS THROW REVERSE SWITCH BUT LEAVE GRAPHICS SWITCH IN WHITE POSITION. FOR BLACK LETTERS ON WHITE GRAPHICS SWITCH IS IN BLACK POSITION FOR NORMAL OR REVERSE.

MANY SPECIAL EFFECTS CAN ALSO BE CREATED BY USING THE GRAPHICS SWITCH AND/OR REVERSE SWITCH AND VARYING CONTRAST AND BRIGHTNESS CONTROLS WHEN SNATCHING WITH VIDEO CAMERA. WITH INPUT FROM TAPE OR RECEIVED VIDEO, VARY RECEIVE CONTRAST AND BRIGHTNESS CONTROLS AND SEE WHAT HAPPENS. MAKE A MULTI-FRAME TAPE OF THE SAME SUBJECT, PLAY IT BACK WHILE VARYING MOD SWITCHES AND CONTROLS. EXPERIMENT. MAKE COMPOSITES BY SNATCHING ONE PICTURE OVER ANOTHER USING BLACK OR WHITE CARDBOARD AS MASKING TO PRESERVE PORTION OF FIRST PICTURE SNATCHED. THERE IS NO END TO WHAT YOU CAN DO. SOME MAY SAY YOUR ROBOT HAS PROBLEMS. JUST TELL THEM YOU'VE DISCOVERED A NEW ART FORM.

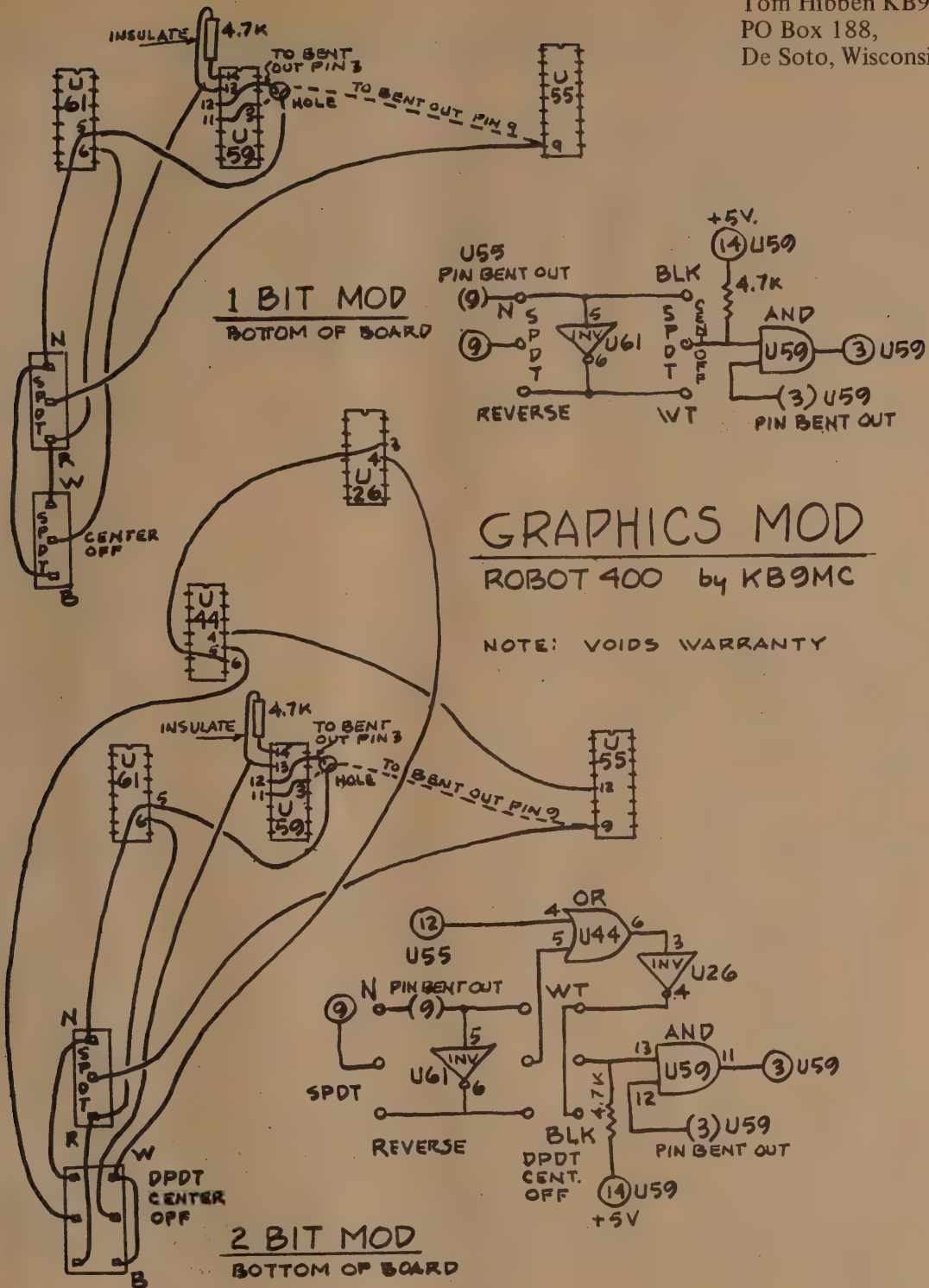




Editors Note: Tom called me one night on the phone and offered this modification thru A5 Magazine to ALL SSTV AMATEURS and not with the intention to hold back his findings or to make profit. Thanks Tom for the "true spirit" of Ham Radio, I wish all thought that way . . . —QCD

3.

Tom Hibben KB9MC
PO Box 188,
De Soto, Wisconsin 54624



1 Bit Mod Wiring (bottom of board)

1. U59 - 4.7K res. between pin 13 & pin 14
2. U59 - Pin 13 to center terminal graphics switch
3. U59 - Pin 3 to pin 11
4. U59 - Pin 12 thru hole in board to bent out pin 3
5. U55 - Pin 9 to center terminal reverse switch
6. U55 - Bent out pin 9 thru hole in board to U61 pin 5
7. U61 - Pin 5 to top term. rev. sw. & bottom ter. graphics sw.
8. U61 - Pin 6 to bottom term. rev. sw. & top term. graphics sw.

2 Bit Mod Wiring (bottom of board)

1. U59 - 4.7K res. between pins 13 & 14
2. U59 - Pin 13 to right center terminal graphics switch
3. U59 - Pin 3 to pin 11
4. U59 - Pin 12 thru hole in board to bent out pin 3
5. U55 - Pin 9 to center terminal reverse switch
6. U55 - Bent out pin 9 thru hole in board to U61 pin 5
7. U55 - Pin 12 to U44 pin 4
8. U44 - Pin 5 to left center terminal graphics switch
9. U44 - Pin 6 to U26 pin 3
10. U26 - Pin 4 to right top & bottom terminals graphics switch
11. U61 - Pin 5 to top term. rev. sw. & left top term. graphics sw.
12. U61 - Pin 6 to bot. term. rev. sw. & left bot. term. graphics sw.

The New TRS-80 Color Computer

Clay Abrams K6AEP
1758 Comstock Lane
San Jose, Calif. 95124

(Continued from January A5 Magazine issue page 40) I have been working on some of the programming techniques for SSTV for almost four years. Additionally, to develop code for a large program requires a second larger computer system. In my largest SSTV program I have about 2500 lines of machine language code, and the source listing is about 54 pages in length. It takes about 45 minutes to print a listing of the program on my Epson MX-80 printer. My big computer system (6809) has 62K RAM with three disk drives and lots of interfaces for printers, ham radio etc. This will give you an idea of the size of computer required to develop ham radio programs for a small computer, and why low cost computer programs are not readily available for all home computers.

SSTV RECEIVE SOFTWARE

Let's move on to give you more information on how the computer can be programmed to display a SSTV picture. The computer can be programmed to receive a picture in any one of 14 formats. I chose to use four formats in my SSTV7.4 package. However, only three of these formats were used to display pictures. The formats used were selected by a trial and error technique. Let's discuss the three modes by which the picture can be formatted:

1. High Density Mode- 128 pixels on 128 lines, 16 gray levels. This picture format is the same as the Robot 400. Using a 32K TRS-80C computer three pictures can be placed in memory. In this mode each pixel is four bits, and each byte is composed of two pixels. Since I can store three pictures the total memory required is 24K RAM. This allows me to use the remaining 8K for program. I did provide a feature in the program to quarter frame four pictures into one high density picture. Since the program allows pictures to be transmitted with a two times zoom, a total of 12 SSTV pictures can be stored in memory or on a cassette tape, and transmitted one at a time. This format of picture density cannot be directly displayed on the TV attached to the computer. However, it can be directly transmitted over ham radio. I did provide a routine in the program to inspect the picture in a low density mode, to verify the picture which you are transmitting.

2. Receive Density- 128 pixels on 128 lines, or 128 pixels on 96 lines, 4 gray levels. In this mode a picture takes 4K of memory. In the program I can store up to four pictures in memory or on cassette tape. These pictures cannot be transmitted over ham radio. I did not provide this feature because the picture quality is somewhat reduced. You may wonder how a color display generator can display black and white pictures. It turns out if you disable the color on your TV, or you are using a black and white TV the 4 gray levels or colors become gray levels. For example yellow becomes

white on a BW TV, blue becomes black and green and red become gray levels. For some reason some TV sets have difficulties resolving red. I think it is a problem with the MC6847 IC. I tried using a 13 inch Zenith TV and the display of red was poor, but the RCA Color Tract works great. This is the set Tandy uses for their Color Monitor. For this display mode I used the 6C or 4C 6847 Graphics mode. I also found that a Color SSTV picture could be displayed. The quality is not as good as a three memory Robot 400 system. This program option only added about 200 bytes to the program. More on this later.

3. Low Density Mode- 64 Pixels on 64 lines, 4 gray levels. This mode was added to provide a quick inspection of a high density picture and used the 2C graphics mode of the 6847.

SSTV TRANSMIT SOFTWARE

Transmitting of a SSTV picture is a simple concept. A memory picture byte is first loaded into a accumulator and divided into two pixels. An accumulator is part of the inner structure of the microprocessor. Each pixel is then stored into the A/D which causes the frequency to change on the SSTV modulator. You then delay a short time before sending the next pixel to the A/D. After 128 pixels are sent you switch the SSTV modulator to 1200Hz which is the sync frequency. You then delay for 5 or 50 milliseconds depending whether the pulse is horizontal or vertical. To do a two times zoom you transmit each pixel twice, and each line twice. This will give you a two times zoom on the transmission of the picture. Although the principal is quite simple, the software is critical. The correct number of microprocessor machine cycles must be counted, and even the addition or deletion of a single instruction may cause the program to malfunction.

COLOR SSTV RECEIVE SOFTWARE

You may be wondering how color SSTV can be displayed on the computer? The current methods for transmission and reception have not changed very much for the last three years and are rather primitive. The transmission method is to send first a red frame then a green frame then a blue one. Most people who have the capability to display color receive each picture into one of three memories. Each memory is attached through an electronics multiplexer to create an analog TV signal on the individual guns of a TV picture tube. This method is very effective, but is costly to implement. The method which I used with the TRS-80C requires no modifications to the computer or the TV set. The MC6847 in the computer takes care of all the formatting of the signals, and only a software algorithm is required to display a color SSTV picture. Lets see how this is done. The first step is to receive three SSTV pictures into memory in specific locations. The next step is to execute a computer

program, to look at each pixel in each location and combine them into a fourth location to form a picture. To do this you must understand how color SSTV works. When each color SSTV picture is loaded into memory, it is just a normal black and white picture. Each picture memory becomes a component of a composite picture. Lets take for example that you wish to display a red pixel on the TV. The red portion of the color picture will contain a white pixel, and the green and blue portions will contain black pixels. With a little clever programming you can scan three pictures in a few seconds and create a fourth color picture. When you switch to the 6C mode of the display, the computer will allow only 4 colors to be displayed. I must admit the method is very crude in this implimentation but the principals can be applied to other display IC's. For example, the TMS 9918A will allow for 15 colors to be displayed with a resolution of 256 by 192 pixels. This IC would allow higher resolution pictures to be displayed. While writing this article I saw and ad for a SS-50 board which uses this chip and has 16K RAM on the card for picture memory. The card has three sound effect generators and eight A/D converters. Since the TRS-80C has the facility to attach to the SS-50 bus, this card could be installed, and you would have a better quality color system.

As you can see with a computer you are not restricted to a dead ended situation as can happen with the hardware scan converters. Your dollar investment is protected from future obselence by the ability to expand the computer as technology advances.

CONCLUSIONS

The TRS-80C is one of the best buys on the computer market today. Some firms have discounted it to \$310 (ref 2). Reportedly over 100,000 TRS-80C's have already been delivered. With this kind of volume, within a year the software base should rival that available for any large, expensive computer.

If you are interested in obtaining more infomation on the software packages I have developed for the TRS-80C for RTTY,CW and SSTV drop me a line with a SASE or IRC and I'll provide a copy of my 6 page listing of amateur radio software.

73's Clay Abrams K6AEP

A5 ARTICLE TRS80-C

REFERENCES

1. SSTV Meets SWTPC- Parts 1 and 2, 73 Magazine, November and December 1978
2. Computer Plus, 245A Great Road, Littleton, Mass 01460, Ph: (800) 343-8124

FIGURE 1
RS-232 INTERFACE (TRS-80C)

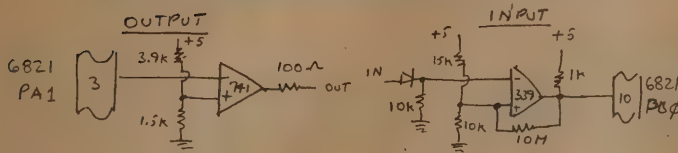
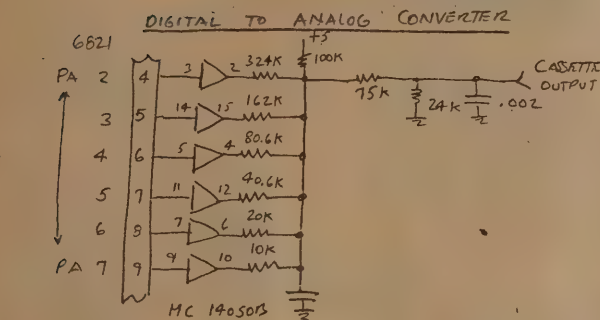
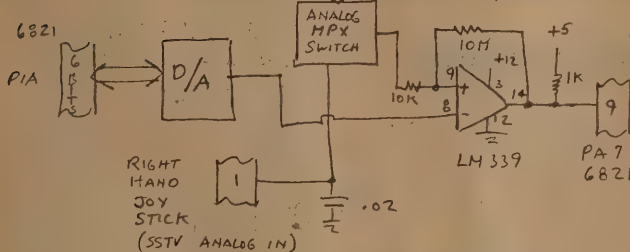


FIGURE 2
TRS-80C ANALOG INTERFACES



ANALOG TO DIGITAL CONVERTER
CONTROL (2 BITS) - 6821



NOTE: 1. CONVERSION TIME APPROX
175µSEC FOR 4 BITS USING
SSTV 7.4 PROGRAM
2. PROGRAMMING TECHNIQUE - SET UP MPX,
SEND OUTPUT TO P/A, LOOK IF PA7 HIGH.
CONVERT VOLTAGE IS SENSIBLE BY TUAL
AND ANALOG.

FIGURE 3
SSTV MODULATOR

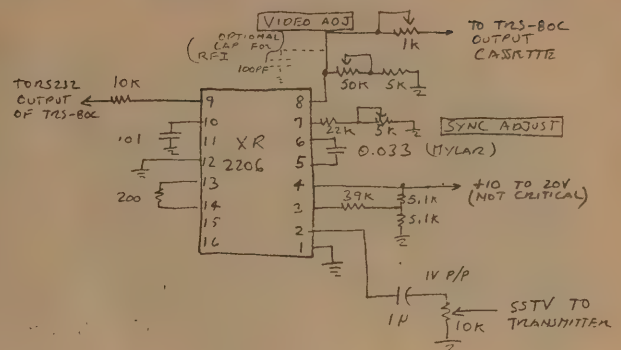
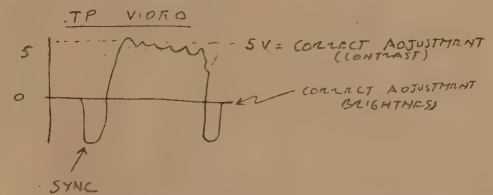
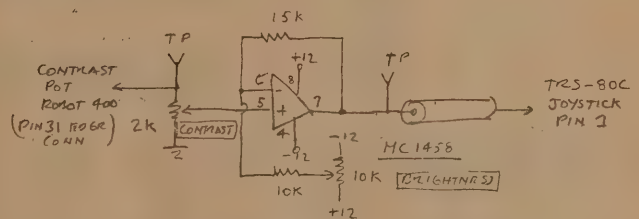
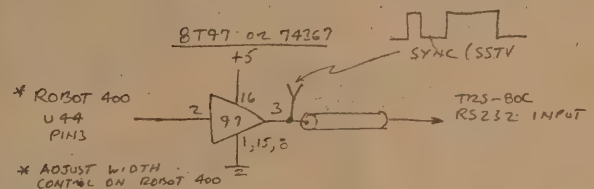


FIGURE 4
SSTV RECEIVE INTERFACE
ATTACHMENT TO ROBOT 400 etc



- CW Receives and transmits Morse CW, 1-99 wpm., automatic correction, Split-screen, Code practice, monitor tone outputs, keyboard memories.
- RTTY Receives and transmits Baudot & Ascii level codes and speeds, Split-screen, storage buffered memories, CW-ID, auto CR/LF, RY generator.
- SSTV Receives and transmits SSTV, 128X128X16 shades, Quadrant displays, Color RGB with 3 memories, Zoom-in, Histogram, Keyboard generator, 50/60 hz.

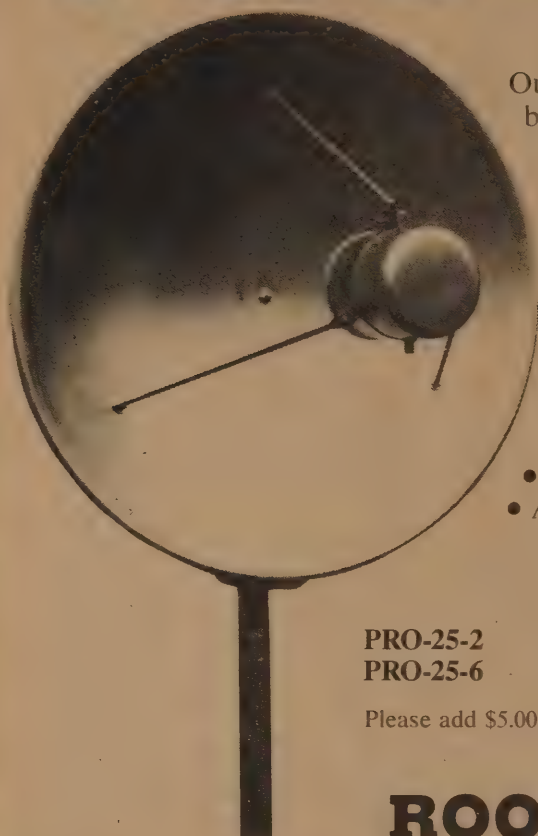
AMATEUR RADIO SOFTWARE SPECIALIZING IN TRS 80C COLOR COMPUTERS

Clay Abrams K6AEP
1758 Comstock Lane
San Jose, Calif. 95124



TRS-80C

PRO-25 MICROWAVE ANTENNA



Our 2.0 Ghz parabolic microwave antenna has been designed to be the ultimate in receiving antennas. It will out-perform the Loop Yagi, the Cigar, the Horn or the Slotted Array antenna by 3 dB or more! The PRO-25 can deliver TWICE the signal power to your microwave ATV down-converter. It can also be effectively illuminated when using the 10 Ghz Microwave Associates Gunnplexer[®] transceiver.

Check these features:

- True parabolic reflector
- 13° beamwidth at 2.5 Ghz
- Quality all metal construction
- 25" diameter with 21 dBi gain
- Professional aluminum feed-horn
- An economical alternative to other commercial units!

Call or write
for our
FREE
CATALOG!

PRO-25-2 Complete antenna kit \$69.95
PRO-25-6 Parabolic reflector only \$24.95

Please add \$5.00 for shipping & handling.

ROOF-TOWERS

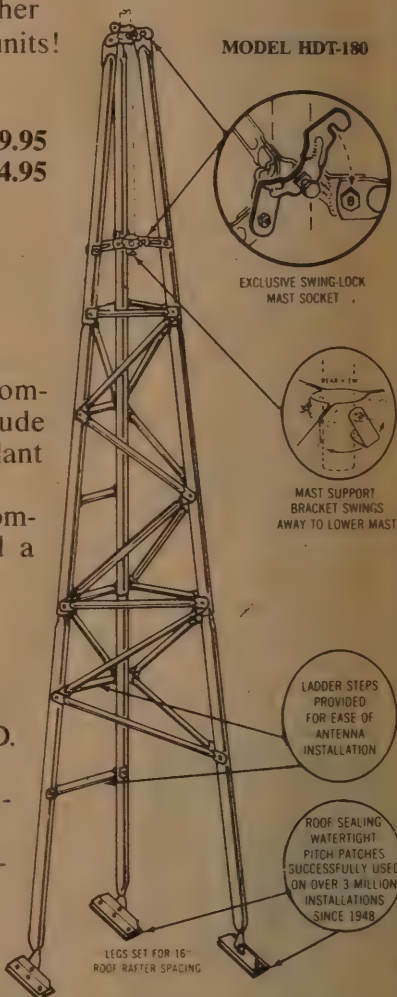
DATA SERVICE COMPANY offers 3', 5', 10' and 15' heavy-duty roof towers which are an excellent choice for making an economical installation of amateur antennas, communication antennas and TV antennas. And if your main tower is already overcrowded, these tripods provide an inexpensive alternative for supporting your VHF and UHF arrays.

The 10' and 15' models feature an integral ladder and unique "swing-lock" mast sockets to simplify antenna installation — no need to balance a mast over the top of the tripod to install it. And you will not have to run to the local hardware store to buy

"supplemental hardware" to complete your installation, we include the lag screws and even the sealant with every unit!

Check these features and then compare our prices, you won't find a better value:

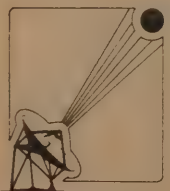
- Shipped via UPS
- 90% Preassembled
- Proven leakproof pitch patches
- Legs set for 16" rafter spacing
- Accommodates up to 1 3/4" O.D. masts
- Integral ladder simplifies antenna installation
- Heavy-Duty Hot-Dip galvanized steel construction

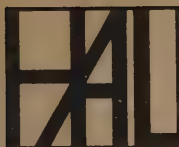


DATA SERVICE COMPANY

3110 EVELYN STREET
ROSEVILLE, MN 55113
Telephone: 612-636-9469

MODEL	HEIGHT	RETAIL	OUR PRICE
HDT-36	3'	\$ 18.85	\$13.95
HDT-60	5'	\$ 26.73	\$20.95
HDT-120	10'	\$ 70.97	\$49.95
HDT-180	15'	\$100.88	\$74.95





HAL COMMUNICATIONS CORP.
BOX 365
URBANA, ILLINOIS 61801
217-367-7373

QUALITY COMMUNICATIONS
EQUIPMENT

NEW



CWR-685A

TELREADER KSR TERMINAL

The CWR685A is a compact electronic communications terminal designed for reception and transmission of Baudot and ASCII Radio Teleprinter (RTTY) signals as well as Morse code (CW) signals. The CWR685A includes a built-in green phosphor CRT display screen and RTTY and Morse demodulators. The very small size of the CWR685A makes it particularly ideal for camper, boat, and other portable installations where space for equipment is limited. Since the terminal operates from 12 VDC, it may be easily used in locations where AC power is not readily available. The CWR685A comes with a separate full but detachable keyboard. Without the keyboard, it is a convenient and small receive-only terminal; attach the keyboard and add transmitting capabilities. The screen of the CWR685A is formatted in 20 lines of 32 characters per line; a total of four different screen pages may be selected. The internal RTTY demodulator allows selection of all three standard shifts (170, 425, 850) for either the "High Tones" (U.S. standard) or "Low Tones" (IARU standard). Transmit AFSK tones match the receive demodulator combination selected. Other transmit features include up to 15 lines of pretype on-screen buffer, automatic transmit/receive control (KOS), and a total of 6-64 character programable HERE IS messages. A parallel ASCII printer output is provide for connection to a receive printer.

**AVAILABLE AT OUR
 DEALERS NOW!**

EASTERN UNITED STATES: SOUTHERN UNITED STATES:

**AMATEUR ELECTRONICS
 SUPPLY**
 28940 Euclid Ave.
 Wickliffe, OH 44092
 (216) 585-7388

**ELECTRONICS INTER-
 NATIONAL SERVICE CORP.**
 11305 Elkin Street
 Wheaton, MD 20902
 (301) 946-1088

ACK RADIO SUPPLY COMPANY
 3101 4th Ave. South
 Birmingham, AL 35233
 (205) 322-0588

AGL ELECTRONICS
 13929 N. Central Expwy
 Suite 419
 Dallas, TX 75243
 (214) 699-1081

**AMATEUR ELECTRONIC
 SUPPLY**
 621 Commonwealth Ave.
 Orlando, FL 32803
 (305) 894-3238

MIDWEST UNITED STATES:

**AMATEUR ELECTRONICS
 SUPPLY**
 4828 W. Fond du Lac Ave.
 Milwaukee, WI 53216
 (414) 442-4200

**DIALTA AMATEUR RADIO
 SUPPLY**
 212 - 48th Street
 Rapid City, SD 57701
 (605) 343-6127

UNIVERSAL AMATEUR RADIO
 1280 Aida Drive
 Reynoldsburg, OH 43068
 (614) 866-4267

**AMATEUR ELECTRONIC
 SUPPLY**
 1898 Drew Street
 Clearwater, FL 33515
 (813) 461-4267

AMATEUR RADIO CENTER
 2805 N.E. 2nd Ave.
 Miami, FL 33137
 (305) 573-8383

BRITT'S TWO-WAY RADIO
 2508 N. Atlanta Rd.
 Bellmount Hills
 Shopping Center
 Smyrna, GA 30080
 (404) 432-8006

WESTERN UNITED STATES:

**AMATEUR ELECTRONICS
 SUPPLY**
 1072 N. Rancho Drive
 Las Vegas, NV 89106
 (702) 647-3114

CW ELECTRONICS
 800 Lincoln Street
 Denver, CO 80203
 (303) 832-1111

HENRY RADIO, INC.
 2050 S. Bundy Dr.
 Los Angeles, CA 90025
 (213) 820-1234

GISMO COMMUNICATIONS
 2305 Cherry Road
 Rock Hill, SC 29730
 (803) 366-7157

MADISON ELECTRONICS
 1508 McKinney Ave.
 Houston, TX 77010
 (713) 658-0268

N & G DISTRIBUTING CORP.
 7201 N.W. 12th Street
 Miami, FL 33126
 (305) 592-9685

RAY'S AMATEUR RADIO
 1590 US Highway 19 South
 Clearwater, FL 33156
 (813) 535-1416



-:-RTTY-:-
GEAR READY, NOW WHAT?

By Joe A. Elliott, K0WVN
607 Wabash St., Topeka, Ka 66616

So far, we have been chatting about *how to get the gear ready* for RTTY. Of course, some of you were sitting real good, ready to get your feet wet with RTTY. From here on, we hope to get you wisely shopping for the next important needs for RTTY. I will be discussing a bit on machines and video equipment this round. I think we should go in this order, since TU's (terminal units) are much easier to locate these days, than a machine or video equipment. So, with this next bit of talk, I hope to make you aware of what to look for. Even those with money to burn has to be wise in making sound investments.

To cover everything concerning RTTY would take a feature longer than this magazine would care to cover, even if I knew everything about the subject. I am a dedicated operator of RTTY and have used various equipment before settling down with computer RTTY. Learning various phases the hard way, has given me some very good experience in this mode. Our purpose is to help you decide which route is best for you, and your pocket book. If money is no object, you can then afford to make mistakes.

Today, there is an ever increasing amount of people getting into RTTY, both amateurs and SWL's. Not only are there a large number of people in those groups looking for equipment, but also a number of deaf people for telephone communications. So, this cuts the supply of available equipment to a minimum, driving prices a bit higher than most care to give. I have helped the deaf and know that they are having a hard time locating machines. MA Bell has been graciously helping them when possible, but the supply of five level machines are coming to an end for MA Bell. In some areas, they were offering ASCII machines even trade for 5 level machines of any type, in order to provide the deaf with communications. So, where does this leave those that want to get into this fine mode? There are machines available, all you have to do is look hard. Soon, Western Union will be turning loose of model 32's, and already have been turning loose of model 28's. So far, from reports that I have been getting, they have been most reasonable in price. By now, you may be asking *WHAT IS A MODEL 28 AND 32?* I will give you some brief information on these and some other machines available today. Without something to type on, we need to go no further! So, I think this is a reasonable place to continue with the subject, after our equipment is fit to handle the mode. For those of you that are interested in video equipment, that will follow after we discuss a bit of the machinery.

The model 15 and model 19 machines are very similar in the printer mechanism. The model 15 is a page printer, coming with or without a keyboard. The model 19 will have both tape punch and tape reader with the printer, normally all mounted on one table. These machines are limited on speed, even at 75 w.p.m. (word per minute), you tend to reach for some goggles and a hard hat. To go faster than this, (and I have seen 100 w.p.m. gears), setting it in cement would be a good idea, not counting some remote control. However, the most common QSO rate is at 60 w.p.m. and they would give hours and hours of pleasurable operation. Also, they are limited to five level RTTY only, here again, five level is the most used yet today. Best of all, they can be bought very cheap. Have some water front dock worker friends go with you when picking up a model 19, it can be a crushing experience without help.

Still the most popular today in five level machines, the model 28 is truly a pleasure to see operate. With their stylish case, it still looks good with any equipment in the shack. Numerous options have made it really the most wanted machine, even myself, with a computer, still have one very good model 28 KSR (keyboard send/receive) standing by. They are still limited to five level, but all speeds on five level communications are possible with either gear shifts, or a change of gears. Basically, it is a very dependable machine requiring very little up-keep.

The model 32 and 33 are almost identical in looks, except the model 32 is the five level version, and the model 33 is the 8 level version. The machines can quickly be identified by the three and four row keyboards. The 8 level (ASCII) will have four rows of keys, the 5 level will have three. This is typical with most machines and a good way to spot the difference right away. The model 32 and 33 has a lot of plastic and compared to a model 28, it is a bit on the noisy side. They are modern looking and the model 32 will do all 5 level speeds, while the 8 level 33 is for 110 baud ASCII. These units are not all that common among the hams, but they are just now appearing on the scene surplus, or phased out of service. Both are now out of production, so you should be able to locate a few in the near future.

The model 35 is another 8 level machine and is very close to looking like the model 28 with the exception of the case. The workings are basically the same, but it is more modern looking and ASCII only.

There are more machines around, Kleinschmidts, Mites and etc.. Here again, we could go on and on. The machines would really have to have an article written on each to cover everything, or every detail and feature about them. The cost will vary on different models, depending on who has them and condition. The model 15's and 19's can be gotten for the price of

removing them out of someone's shack, or cost up to \$75.00. The model 28 KSR will sell for anywhere between \$75.00 to \$150.00, and the ASR's will bring anywhere from \$150.00 to \$400.00. The model 32's and 33's will bring in the neighborhood of \$150.00. Mites are still up there around \$200.00 and Kleinschmidts (various models) will run from \$100.00 to \$200.00. I would like to point out here, this depends on what features they have and condition. They are lurking in the least expected places, just ready for someone to stumble into them. There are several dealers in used RTTY machines and still some being offered in government surplus sales. So, they will not come to you, it is up to you to make an effort to locate them.

We can, in the future, cover various machines individually. As I said, an article this size will still leave a lot of details left out. However, there is the other popular question, **'SHOULD I SPEND MY MONEY ON A MACHINE OR INVEST IT IN A VIDEO?'** Well, if you were to get a ridiculous buy on a machine, it would be worth it to see if you wish to invest more in RTTY. You could (I doubt it) see that you do not like RTTY and be stuck with some rather high priced gear to get rid of, or eat. However, there are other ways to invest in RTTY gear and still have an out. Okay, you knew I was going to say it, of course, the **COMPUTER**. As our computer editor has pointed out, computer RTTY is not that complicated and expensive. Sure, we can be talking about \$600.00 to \$1,000.00, depending on how serious you want to get. Actually, you can get into it cheaper than \$600.00 when going the Radio Shack Color Computer. Others, such as the Radio Shack TRS-80 model III, Apple II, Heath H89, to name a few, are a bit more expensive than a machine. BUT, with computers, you can not only perform about anything you want from RTTY to word processing, you can entertain your family, calculate that antenna system, log calls, figure Oscar orbits and on, and on, and on. If you wish to sell it, wanting to do something else, you can put an add in the local newspaper, not having to depend on another ham to buy it, giving you a great deal more shoppers, both at home and in the mags. If you are not one that wants to fool around, wanting to get right on, money no object, then you can get you a dedicated terminal. Now, I am not going to say that a RTTY video terminal is not going to match what you can do on a computer when operating RTTY/CW/SSTV. Basically, most are computers, but most are not programmable by the user, usually limiting you to the modes you bought it for. When you tire of those modes, tough, find something else to do. Those of you that are wanting to explore the future, see what you can do with a computer, it is a rewarding experience. There are those that say 'I am too old to fool with that sort of thing', but they find out that they have really been fooling themselves when venturing into it. I have gotten more hams on computers over the age of 70 years old than under this age. They all have claimed to have more fun on RTTY now, not counting the fun of what the computer can do. Here again, you can have a lot of fun on dedicated units, some will not want to fool with such things as programming, or not able to for various reasons. This is another of those areas that you should explore a little, ask all you know that have video units of different varieties. As you can see, there is a tough argument here. Compare prices, features, flexibility and a return on your investment is not a bad way to think, I call it **PRACTICAL THINKING!** There are a few that are using the computers not only in working RTTY, but in their business too.

Some of the RTTY hams using computers have found that RFI from those units will sometimes cause a problem with their receivers. Up until recently, there was nothing that could be done about the RFI from the computers, that was what you got when you bought one. Now, FCC has put the clamps down on the computer manufacturers, forcing them to meet a standard of RFI emission. This is not saying that they are completely RFI proof, only that they have improved upon the problem. So, even though you get one of the newer units, you could still have a problem under some conditions. Those that have long wire antennas, beams, quads, or any type of antenna close, or over the top of the shack, could still have a problem with harmonics in the receiver from computer RFI. Bad coax, poor grounds, poor shielding, jumper wires hanging around, just about any thing of this nature could give poor results. One fellow ham had his beam on top of the house, experiencing RFI reading S-7 on his Drake. When he moved the antenna away from the house, put it on a tower, his RFI problem disappeared. Another fellow ham was experiencing the same type signal on his Collins receiver, finding out later that it was due to some bad coax. Now, I know there are some that would rather not go to these extremes and go dedicated RTTY video as an answer. A dedicated RTTY video would be the easy way out of a situation that you are unable to change easily. Most of us are lucky, my Radio Shack TRS-80 model one is five feet away from my Collins 75S3, my antenna is about 75 feet away in back of the house and the shack is in the finished basement towards the front of the house. I don't have a problem at all with computer RFI bothering the receiver, or the xmitter bothering the computer. Some RTTY software/hardware interfaces will not help things in the RFI department, however, I use the Crown Microproducts RDM-116 unit on mine with no problems at all. So, those determined to use computer RTTY/CW, may find that they will have to do some cleaning up of cabling and antenna systems.

Now, those of you that have a dedicated video terminal, don't get excited! I am not saying that dedicated units are not efficient in what they were designed for, only that they are limited in what the user can do with them. I simply want to point out the pro's and con's to a prospective RTTY'er, so it will give them a good idea of what to look out for and possibly expect. I would hope that anyone looking to get into this mode, will certainly take their time, ask around, question everything and not fall for one person's, or company's sales pitch. After all, in most cases, you will not be able to try out equipment like you can a used car, so you have to pretty well have in mind what you want for the money you have available.

CHICAGO AREA RADIOTELETYPE REPEATER SYSTEM

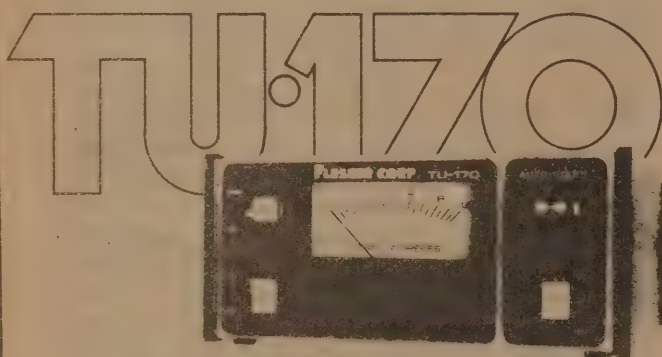
1549 NORTH CICERO • CHICAGO, ILLINOIS 60651

WHAT FEATURES DO WE LOOK FOR IN DEDICATED VIDEO TERMINALS, OR COMPUTER PROGRAMS? Well, there are a lot of RTTY operators that failed to explore this before they purchased their gear. Of course, by the time this has happened, you are pretty well stuck with what you have and you make the best of it. Let's see what kind of features I have here and you can see how many you can find on others like it. Split screen, preload buffer (limited to memory capacity of unit), message buffer (to store a message of any nature, 2K or more characters), utility buffers (for storing brag, address or anything that comes to mind, 10 of them is nice), CQ call up, Quick brown fox test call up, RYRYRY test call up, diddle (able to turn on/off), unshift on space (able to turn/off), contact call sign buffer (able to delete anytime without disturbing operators call sign), operators call sign buffer, repeat last transmission, formatted screen (selectable on/off), WRU (programmable call ups), printer (on/off, able to give hard copy and video at same time), CW ID (able to use either narrow or wide shift ID), status indication (giving status of baud, ASCII/Baudot, buffer counter and etc. on screen all the time), auto ten min CW ID (ability to set time interval or completely off), all five level speeds, all ASCII speeds (up to and including 1200 baud), time/date print out (nice for keeping log), ----- just to name a few things you can find when using video terminals and computers. There are a few other things to look for, generally over looked by most people. You should ask about the I/O (inputs/outputs) available, such as RS232, TTL compatible, and isolated loop keying. Beware of 'ALL IN ONE' units, you can get stuck with things that you might wish you could change. Some have found that they do not like the internal demodulators, not being modular, they can't do much about it other than gripe. So, carefully consider the modular way before leaping into a compact unit. If you are cramped on space, then the compact way does help. Make sure you have a large screen, a 12 inch monitor is best and less tiring to the eyes. It is also nice to have a 64 to 80 character line, so not to lose characters so fast that you have to keep your eyes on the screen (not able to preload anything from fear of missing something). Hopefully, you will get the chance to see some video units in action before making your choice.

This should give you some feeling of what you would like to have when looking for your system needs. With a bit of shopping and patience, you can get into this mode and not make too big of a hole in the purse. Ask around, compare systems, look them over and keep an eye on the ham want adds. By doing this, you will satisfy yourself knowing you did your best to get the best buy for your money.

These subjects are not covered enough by far, either on machines or video terminals. However, maybe we can discuss it even further in a later article follow 'SHOPPING FOR TERMINAL UNITS'. In the meantime, do take care and be good!!!! 73's
:DE:: K0NVN--:JOE--

Compare the



Interested in RTTY?

\$169.95 buys a terminal unit kit with the features you need most for enjoyable RTTY. Our 3-stage active input filters, built-in AFSK and 60 mA loop supply make the TU-170 a great buy regardless of the rig or printer you prefer.

Sound interesting? Call or write for details about our full line of RTTY equipment backed by a complete factory support program.

Flesher Corporation

P.O. Box 976 Topeka, KS 66601 913-234-0198
Distributors in Canada and Australia

RTTY THE INEXPENSIVE WAY

RACK LINE BOARD KITS BY DAYTAPRO
ALL RACK LINE BOARDS ARE 6½x4½

THE UT-4

Speed converter with 128 word memory, and variable speed output, On board Clocks, a transitional autostart circuit, plus many additional extras. #23-1805 \$109.95

AFSK GENERATOR

Offers rock stable RTTY mark & space Tone 170/850 switch selectable. #23-1710 \$29.95

CW ID SYSTEM

Multi interfaced ID with and automatic 10 minute timer and variable speed output. Diode programmable. #23-1721 \$27.90

POWER SUPPLY

This Kit may be configured in three ways,
To supply a complete TU #23-1725 \$ 56.99
A +5,+12,-12 Volt Supply #23-2125 \$ 34.99
A basic Printer Loop Sply #23-2025 \$ 31.99

Daytapro Electronics

3029 N. WILSHIRE LN., ARLINGTON HTS. ILL. 60004
312-870-0555

Stamp brings our Catalog featuring over 1000 electronic components. All orders add \$ 2.00 for shipping and handling.

TEM MICROWAVE CORP.

22518 97TH AVENUE NORTH, CORCORAN, MINNESOTA 55374-612-498-8014

THE RX-2300 MICROWAVE DOWNCONVERTER PRE-BUILT — NOT A KIT!

The TEM RX-2300 downconverter is a state-of-the-art low-noise microwave receive converter that can be used to convert microwave signals in the 1900 - 2700 Mhz range down to VHF. The RX-2300 is especially suited for line-of-sight reception of broad band amateur, digital, FM, AM or TV modes of transmission and outputting to a standard VHF receiver or television.

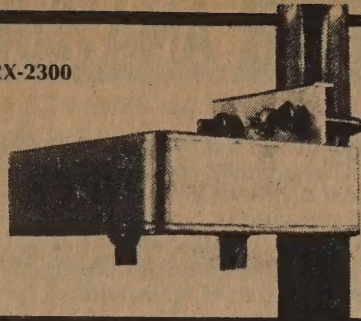
Other features include: mast head mount, remote tuning, microstrip construction, temperature compensation and standard power requirements. This compact unit is housed in a high quality cast metal box and is fitted with a mast clamp for easy installation. Each RX-2300 is quality constructed and pre-tested to assure high performance, excellent stability and long life, even when subjected to severe climate conditions.

A built-in low-noise front end preamplifier and high gain broad band IF amplifier assure top performance and versatility from this unit.

— SPECIAL TO A5 READERS —

A full 10% discount off the list price of all TEM products when you mention this ad.

THE RX-2300



GENERAL SPECIFICATIONS:

Frequency Range: 1900 - 2700 Mhz input; 30 - 225 Mhz IF output; preset to convert the amateur band to TV channel 2, 3 or 4 (specify LOW) or channel 7, 8 or 9 (specify HIGH). The remote tuning range is plus/minus 15 Mhz.

Performance: Front end device is rated 2.4 dB NF at 2 Ghz; conversion gain is greater than 25 dB.

Power Requirements: + 12 to 17 VDC @ 30 ma. variable voltage; fed via the 75 ohm coaxial feedline.

Mechanical: Housed in a 3.6" x 4.5" x 1.1" cast metal enclosure; RF input connector is a BNC (Type N optional); output connector is a standard 75 ohm TV type F.

Antenna Requirements: Any good 2 Ghz 50 ohm horn, yagi, slotted array or parabolic dish type.

Price: \$150.00 each, shipping included. Add \$5.00 for Type N connector option.

Please write us detailing your requirements for other frequency options and dealer quantity pricing.



LAB-TRONICS, INC. P.O. Box 171, Rogers, MN 55374

Telephone: 612-428-4226

MICROWAVE LOW-NOISE PREAMPS

Two models offered which are prebuilt and tuned. They require a positive 12 - 17 VDC power source. Noise figure typically 3 dB.

Model PA-13-3:

- Single stage 10 dB gain.
- 1 1/4" x 2" board with teflon coax pigtails.
- Installs inside most downconverter enclosures.
- 2.0 to 2.6 GHz range.

Model 2001:

- Two stage 20 dB gain.
- Housed in weather-proof box with coax connectors.
- Connects between antenna & downconverter.
- 1.7 to 2.6 GHz range.

PRICE: \$50.00 + \$1.00 shipping **PRICE: \$110.00 + \$1.50 shipping**

Full 90-day warranty on both Models!

— FREE OFFER —

While they last!

Send us a legal size self-addressed envelope with 52¢ postage affixed for your FREE copy of the controversial 73 Magazine article "You can watch those secret TV channels". We will also include the largest list of experimenter microwave parts and products available in the USA!

From the home of the "Original", as described in 73 Magazine.

Now the new 2 GHz Microstrip Model LT-13

AMATEUR MICROWAVE TV DOWNCONVERTER

- Super performance
- Built-in preamp
- Vari-cap tuning (no line cutting)
- Compact size
- Any VHF channel output (2 through 13)
- Same low price

LT-13: The electrical package includes all transistors, mixer diodes, resistors, chokes, capacitors, and a quality printed circuit board with the delicate chip capacitors pre-mounted for you.

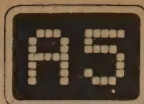
PRICE: \$40.00 + \$1.00 shipping

HW-13: The hardware package includes a pre-drilled cast aluminum enclosure, quality connectors (BNC for RF input and a type F for the i-f output), mast clamp, and all miscellaneous parts.

PRICE: \$17.50 + \$1.00 shipping

— SPECIAL OFFER —

Mention this A5 ad and get your HW-13 hardware package for only \$12.50, when ordered with the LT-13 downconverter kit at the regular price of \$40.00.



AMATEUR TELEVISION MAGAZINE

INTERNATIONAL

US POSTAL SERVICE PUBLICATION #944-960 ISSN # 0279-4772

A5 AMATEUR TELEVISION MAGAZINE is published 12 times per year by Mike Stone WBØQCD, Lowden, Iowa and is printed and distributed by bulk-mail from Topeka, KS. Publisher reserves all rights. Blanket permission is given to any Amateur Radio publication for reprints of any articles contained herein with proper written notification to Editor and crediting A5 ATV MAGAZINE as the source used. Copies of the reprinted articles are to be mailed within 10 days of publish date to A5 MAGAZINE. A5 ATV MAGAZINE and ATV IN A NUTSHELL publications are permanently recorded on microfilm and indexed at the U.S. Library of Congress, Washington, D.C. A5 MAGAZINE is devoted and dedicated to Amateur Television and other modes of Amateur Specialized Communications. A5 MAGAZINE is an INTERNATIONAL publication with subscribers from all parts of the world. Address all inquiries and information to: A5 MAGAZINE, PO BOX H, LOWDEN, IOWA



	Surface U.S./Canada Mexico	Surface All Foreign	Airmail Central S. America	Airmail All Other Foreign
1/2 year	\$ 10.00	\$ 13.00	\$ 20.00	\$ 23.00
1 year	\$ 20.00	\$ 26.00	\$ 40.00	\$ 46.00
2 year	\$ 38.00	\$ 50.00	\$ 78.00	\$ 90.00
3 year	\$ 56.00	\$ 74.00	\$ 116.00	\$ 134.00
Life	\$400.00	\$520.00	\$800.00	\$920.00

(12 ISSUES PER YEAR)

Please... only U.S.
currency, foreign checks
drawn on U.S. banks
or money orders in
U.S. funds!

Back issues \$2.50
each postpaid

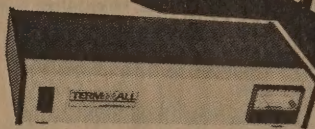
Foreign Reps. EUROPE-Joachim Breucha DJ4GL, Am Moosbuegl 9, 8432 Beilngries, West Germany. Andrew Emmerson G8PTH, 4 Mount Pleasant, Blean Common, Canterbury, England. AFRICA-Gerald Klatzko ZS6BTD, PO Box 9665, Johannesburg, South Africa 2000. SOUTH AMERICA-Nicolas Zderich CE3AUL, Casilla 13630, Santiago, Chile. OCEANIA-Nelson Dyett ZL2FR, 71 Coutts Street, Wellington, New Zealand E3. ASIA-Takao Yabana JAØBZC, 4-29 Habaue, Matsumoto, Japan 390. CANADA-George Davis VE3BWW, PO Box 1383, Niagara-on-the-Sea, Ontario LØS1JØ. Bert Farmer Sr. VE6PW, 1155 Reader Crescent NE, Calgary, Alberta, Canada T2E5J8. Always send SASE to foreign representatives.

Out of stock-back issues and articles available; Article Master-list \$1.00. Complete back-issues (copies); Vol. 1-8 \$1.50 each, Vol. 9-11 \$2.00 each, Vol. 12 to present \$2.50 each. Specialty packages (collection best articles) FSTV-MSTV-SSTV-FAX-COMPUTERS-RTTY-ROBOT 400 MODS- (specify) \$3.00 each. All postpaid with return envelopes furnished. Allow two weeks for delivery. WBØESF Ralph Wilson, 4011 Clearview Drive, Cedar Falls, Iowa 50613. (Foreigners send IRC's for return mailing via Air-Mail.)

**ATV Magazine and ATV In A Nutshell
are now on permanent archives at the Library of Congress**

TERMINALL

**MORSE
BAUDOT
ASCII**



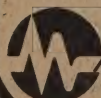
NEW!

SEND & RECEIVE CW & RTTY

TERMINALL is a hardware and software system which converts your TRS80® into a state of the art communications terminal.

- TERMINALL is easy to use. Plug into your receiver headphone jack and copy Morse code or RTTY. Plug into your CW key jack and send Morse code. Attach a Microphone connector and send Baudot or ASCII RTTY using audio tones (AFSK). That's all there is to hooking it up.
- Fantastic Morse reception: No adjustments are necessary to receive Morse code - it's fully automatic! Six stage active filter demodulator and auto adaptive Morse algorithm copies the weak and sloppy ones.
- Separate RTTY and CW demodulators. Built in crystal controlled AFSK CW and PTT keying, 60 mil loop interconnect, RS-232 IN and OUT, hand key input and side tone output.
- Built in parallel printer driver software allows hardcopy in all modes.
- Hardware clock maintains accurate time.

- Multiple user defined WRU functions - you select initiate sequence, terminate sequence, what to transmit back and whether to save on tape or not.
- Word wrapping, word mode editing, diddle, ignore carriage returns, user programmable end of line sequence, adjustable carriage width, transmit delay (fixed, none or auto adaptive), excellent documentation, break mode and much more.
- TERMINALL has capabilities far surpassing dedicated terminal systems. And since it works on a general purpose computer, the majority of your investment (the TRS80) is spread out over many different applications. You get more for your money.
- Complete with software on cassette and diskette, assembled and tested hardware, and extensive instruction manual. Specify Model I or Model III. Level 2 16K required \$499.
- 15 day money back trial period. One year parts and labor limited warranty.



MACROTRONICS, inc.
1125 N. Golden State Blvd.
Turlock, California 95380



To Order Toll Free
1-800-344-7493

In CA. & for Service
(209) 667-2888/634-8888



Europe's leading ATV Organization with over 1,000 members worldwide! Membership information may be obtained from G8GQS B. Summers, #13 Church Street, Gainsborough, Lincolnshire, England. CQ-TV Magazine is a quarterly journal sent free to BATC members. Published by G3YQC. Send \$11.00 (U.S.) payable to BATC now!

Introducing

The ~~KW~~ SC-422A 3-Memory Color SSTV Scan Converter System

Featuring Motion Animation and Colorflash!



The only complete SSTV 3-Memory system on the market, ready and available for today's active Amateur! Priced less in total system cost with features not available on modified additional memory board circuit designs, the SC422A system receives and transmits FULL COLOR as well as Black-White SSTV with a selectable 128 or 256 pixel resolution. The 16 shade grey-scale display greatly improves the enhanced quality of SSTV pictures as compared to an 8-level display and, with the simple flip of a switch, allows 256 pixel 16 second (half speed) format transmit and receive for QRM or multipath reduction of SSTV pictures. A selectable BLEND, LINE or DOT raster display allows the operator a choice of received format and a tunable signal SYNC control "locks" in on "off-frequency" stations without having to retune the VFO! With a picture locked in memory, a visual TRANSMIT CURSOR provides output tracking of the transmitted picture and a unique SEE THROUGH MEMORY provides FSTV display from the camera for alignment of the next picture. The dual-speed, automatic SNATCH CONTROL allows transceive picture frame rotation (great for CQ's) and in the "fast" position displays SSTV MOTION ANIMATION! In the COLOR MODE, a continuous alternating of memories 1 and 2 provides a great COLOR FLASH feature! The "fantastic" KB422A Special Effects COLOR Keyboard and LG422A Video Light-Pen graphics can be superimposed over any picture in memory. Every color of the rainbow is possible with this COMPLETE COLOR SSTV operating system designed and built by Volker Wraase.*

"Why settle for an incomplete, outdated and warranty-voided SSTV system?"

Available KW-CE1101 Color TV Matrix Encoders

~~KW~~ Control Systems, Inc.

(U.S. Distributor & Service Center)

c/o Walter Giesser WB20WX (914) 355-6741 Ext. 207

R.D. #4, Box 114C, South Plank Rd., Middletown, N.Y. 10940

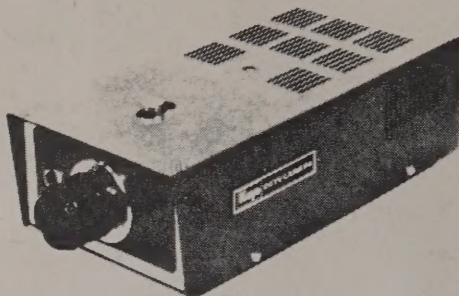
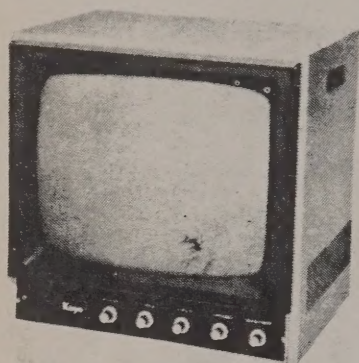
IMAGE-21

"Extending Your Vision Electronically"

... JUST A PHONE CALL AWAY!



**SPECIALISTS IN A WIDE VARIETY
OF BLACK-WHITE and COLOR
TV CAMERAS and MONITORS!**



PARTIAL LISTING of CAMERAS and MONITORS:

- Hitachi HV-62 2/3" general purpose camera, 500 lines, ALC, line lock, F1.6 lens.....\$235.00
- Hitachi HV-62S 2:1 interlace camera, 550 lines, ALC, white suppression.....\$326.70
- Hitachi GP-5 color camera w/6:1 zoom lens and electronic viewfinder.....\$1195.00
- Hitachi VM-910 9" 500 line monitor.....\$216.00
- Koyo TVM-90 9" 600 line monitor.....\$194.00
- Koyo MV-12 12" 700 line monitor.....\$320.00
- Sony /Image-21 custom color rcvr-monitor.....\$715.00

**WRITE for FREE
BROCHURES on
OUR FULL LINE
plus hobbyist
catalog from our
parent company,
ATV Research.
DIAL 402-987-3771**

IMAGE-21

Division of ATV Research
1303 Broadway
Dakota City, Nebr. 68731

A5 AMATEUR TELEVISION MAGAZINE, PO BOX H, LOWDEN, IOWA 5225-0408 2ND CLASS BULK RATE PERMIT #944960 PAID AT TOPEKA, KS. & LOWDEN, IA ATTENTION POSTMASTER: IF UNDELIVERABLE, RETURN POSTAGE GUARANTEED. ADDRESS CORRECTION REQUESTED